



WILD GAUR IN MUDUMALAI

Photo—T.N.A. Perumal.

CHEETAL



JOURNAL OF THE

Wild Life Preservation Society of India

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No. 1

Wild Life Preservation Society of India

I. The aims and objects of the Society are as follows:

- (a) To promote interest in and impart knowledge regarding the preservation and conservation of all forms of wild life, particularly among the youth of the country.
- (b) To co-operate with the Govts. of India and States and with other Societies and Institutions having similar aims and objects in working for the interests of wild life.
- (c) To assist in enforcing and actively supporting the Forest Acts, Wild Birds and Animals Protection Acts and Rules etc. of States and the Indian Arms Act and Rules in so far as they pertain to wild life and to bring to the notice of the authorities any infringement of the same and to assist in the detection and prosecution of offenders in respect of such laws.
- (d) To advise and help the Govt. and wild life administrators in the formation, maintenance and protection of Sanctuaries and National Parks, the preservation of wild life in general and rare species of India in particular and in the introduction of exotic species into the country, the rehabilitation of rare species etc. and in the revision on rational lines of the shooting and fishing rules, so as to conserve and increase wild life stocks.
- (e) To raise funds for the carrying out of the above aims and objects and to found and maintain museums, reading rooms and libraries of natural history in order to disseminate knowledge regarding wild life.
- (f) To promote sportsmanship in shikar and to recognise well regulated shooting and fishing, as a means of preserving wild life and fish so that through wise use the surplus may provide a recreational asset to the nation.
- (g) To carry out publicity and propaganda for the preservation of wild life in India by means of monographs, journals, bulletins, films, film strips and other feasible methods.
- (h) To assist members of the Society in obtaining shooting and fishing facilities and facilities for viewing and photographing wild life in India.
- (i) To conduct research into the problem of Wild Life management in India, and in pursuance of this, to initiate, encourage and, where possible, assist in projects for the study of threatened species and related subjects and to provide reference and research facilities for such work.
- (j) To carry on such other activities which will serve the above objectives.

What membership of Wild Life Preservation Society of India will entitle you to ?

1. You will become an active member of the growing number of Wild Life enthusiasts, who enjoy working for and spreading the knowledge of how to conserve India's heritage of Wild Life for posterity.
2. You will be entitled to the full use of the Library of the Wild Life Preservation Society and of its reading room.
3. You will receive a membership certificate.
4. You will receive a personal Identification and membership card.
5. You will be entitled to buy all publications of the Society at a concession rate.
6. You will be entitled to buy at concession rates the Societys' Greeting Cards, Calenders, Tie and the Balance of Nature Game (Specially published in colour for its educative and recreational value).
7. You will be supplied "Cheetal", the Half Yearly journal of the Society free.

II. The Society has, upto date:—(30-9-1965).

Patrons	...	21	Educational members	...	29
Life members	...	39	Professional members	...	35
Ordinary members	...	156	Honorary members	...	9
Institutional members	...	4	Family members	...	Nil
Affiliate members	...	5	Student members	...	200

III. Executive Committee

President—His Highness Maharaja Pratap Singh
Malvendra of Nabha—Regional
Secretary for North India, Indian
Board of Wild Life.

Senior Executive Vice-President:—Shri S.S. Negi
(Retd. Conservator of Forests).

Vice-Presidents:—1. Shri P.D. Stracey—Forest
Advisor, N.C.A.E.R.

2. Dr. Bains Prashad.
3. Sardar Ranbir Singh.
3. His Highness the Maharaja of Kotah.
4. Shri R.C. Kaushik—Director of Forest
Education, F.R.I. & Colleges, Dehra Dun.

Honorary Secretary & Treasurer:—Dr. R.N. Misra.

- Asstt. Hony. Secretary**:—1. Dr. S.K. Sangal.
2. Shri Bharat Singh,
F.R.I. & Colleges,
Dehra Dun.

President's Speech at the 7th Annual General Meeting of the Society held on 9th Oct. 1965

Guests & Members :

It is my proud privilege to welcome you all to this Seventh Annual General Meeting of the Society.

The audited accounts for the year 1964-65 of the Society which are before you show a deficit of Rs. 1,715.00 as against Rs. 695.00 for the year before but this is negligible when we see that during the year the assets of the Society have increased from Rs. 10,932.00 to Rs. 21,778.85.

Much progress has been made since we met last year and it seems that India has turned the corner and we may perhaps look forward to rapid progress in her programme of Wild Life conservation.

We meet under the shadow of an uneasy peace when all the energies of the nation have naturally to be concentrated on its defence efforts. The country's Wild Life is threatened seriously as a consequence of war, and more concentrated efforts are needed to bring home the urgency of Wild Life conservation to all.

The Planning Commission is busy drawing up a programme of conservation of nature and wild life and providing money for it in the Fourth Five Year Plan. The Central Government is also paying special attention to the problem and is drawing up a Wild Life Policy for India. The Indian Board for Wild Life is doing real service in this connection, as an advisory body though I wish it could be more practical and effective for conserving Wild Life of the country.

Many State Governments have organised Wild Life Boards and seek their advice, with a view to implementation of the policy and recommendations of the Government of India. The Government of Uttar Pradesh leads others in having an effective organisation for the preservation of Wild Life, but naturally, our expectations rise higher every time something is achieved.

The ignorance that prevails throughout the country about Wild Life and the danger of our losing the precious national heritage for ever can only be removed by wide publicity supported by practical steps for developing a true interest for the preservation of Wild Life in the minds and hearts of the youth of the country. It is in this sphere that our Society can play a very important role. It has actually been doing so by acting as a catalytic agent both in Governmental circles and with public. Our efforts have not been in vain and the awakening that is noticed is heartening. Unfortunately our efforts are greatly restricted by the lack of finances and even now the payment of the small annual grant of Rs. 1,000.00 (Rupees one thousand) that the Government of India has graciously sanctioned towards the publication of the Society's Journal "CHEETAL" the only Journal of its kind in India is being held up due to procedural difficulties.

Our Society has been active during the year under review and we have embarked on new schemes of development, as well for strengthening what we have been doing so far. I am happy to say that the Society is now recognised and helped by the Government. We

are now not only publishing a thousand copies of "CHEETAL" but a better "CHEETAL" as I hope all of you will agree. The Society has offered suggestions for an effective Wild Life Policy for the country. During the year the editor toured a number of schools and made the Society better known and the "CHEETAL" more popular. The Statesman and Hindustan Times donated space for advertisement about the Society free of cost, for this we are thankful to them.

The President of the Bihar Branch of the Society was very active and organised a number of exhibitions of Wild Life Trophies in rural Bihar and published a number of articles on Wild Life in various newspapers, thus promoting the cause of Wild Life conservation.

The Assam branch of the Society is growing from strength to strength under the guidance of Mr. E. P. Gee and has been named to NORTH EAST INDIA branch.

The Government of Uttar Pradesh has granted representation of the Society on Uttar Pradesh Wild Life Board for which we are grateful. The Honorary Secretary attended the Second Meeting of U.P. Wild Life Board at Dhikala and made constructive suggestions for the preservation of Fish and Wild Life in Uttar Pradesh, as well as for improvement of Corbett National Park.

The Government of Maharashtra, through the efforts of one of our members in Bombay, has started purchasing the "Cheetal" for all Gazetted Forest Officers in the State. The Government of Assam has been doing so for many years now. We look forward to active co-operation and help from all other States.

The research programme of the Society received welcome financial support from the Sir Dorabji Tata Trust in the form of a donation of Rs. 2,000.00 for its Himalayan Wild Life Research Project, for this we are very grateful to the Trust Authorities. This is a very healthy sign and we hope for many more donations from philanthropists, game lovers and Charitable Trusts in India for preservation of Wild Life in the country.

I am glad to say that the Sr. Ex. Vice President, Sri S. S. Negi and the Honorary Secretary and Treasurer, Dr. R. N. Misra have served the Society with selfless devotion and the progress of the Society is to a very great extent the result of their efforts. The members of the Executive have always extended the fullest measure of their co-operation and help and but for this we may not have achieved the measure of success that we have.

I am glad to notice a number of student members of the Society and I wish more of them could come and take more interest in Wild Life. It is they who have to shoulder the responsibility in future and be friends of Wild Life which has few friends and many enemies.

I must thank the Director of Forest Education, F.R.I. and Colleges, Shri R.C. Kaushik for permitting the use of the premises of the Forest College for this meeting. I also thank all members and guests for making this meeting a success.

Thank you.

Honorary Secretary's Report at the Annual General Meeting of Wild Life Preservation Society of India, 1965

It is my pleasant duty to present a report on the working of the Wild Life Preservation Society of India for the year ending 31st March, 1965.

Membership

Membership of the Society is gradually increasing and during the year Six Patrons, Nine Life Members, Twentyfive Ordinary Members, One Institutional Member, One Affiliated Member, Seven Educational Members, Eight Professional Members and One Honorary Member joined the Society. The number of Student members joining the Society was more than a hundred. Thus the total increase in membership during the year was more than one hundred and sixty. This was due to the keen interest taken by members in securing more members for the Society. All of us have to work hard to secure more members till the Society reaches the take off stage when more and more members will be joining the Society of their own accord.

Cheetal

The Half Yearly Journal of the Society is becoming more popular and now we are printing a thousand copies to satisfy the increasing demand. It is being subscribed to by at least two State Governments for all their Gazetted Forest Officers. The Journal is more attractive and useful now. Cheetal is still being published at a loss as the report of the auditors mentions, but we expect a grant from the Government of India soon, towards the cost of publishing the "CHEETAL".

Revenue Account

The Auditors report, the audited Income and Expenditure account and Balance Sheet for the year is before you, and you will be glad to see that the financial position of the Society is satisfactory. The assets of the Society have increased from Rs. 10,932.00 on 31st March, 1964 to Rs. 21,778.85 on the 31st March, 1965. There is a deficit of Rs. 1750.96 during the year but this is not alarming as the assets have also nearly doubled during the year.

General

Wild Life Week was celebrated with the usual enthusiasm with film shows and lectures in educational institutions and clubs. The Corbett Essay Competition was held. The Society received donations in cash and kind from the President of the Society, His Highness Maharaja Pratap Singh of Nabha for which the Society is grateful to him.

Library

Firm foundations have been laid for building up a LIBRARY of Wild Life Literature and we have nearly a hundred books in the Library. More donations of books are coming in. The Society has been receiving a continuous supply of Wild Life Photographs and thanks are due to Mr. M. Krishnan, famous Wild Life Photographer and other members.

Research Programme

Research Programme of the Society has been continued inspite of financial difficulties and the Society is thankful to Sir Dorabji Tata Trust for donating a sum of Rs. 2000.00 for the Himalayan Wild Life Research Project of the Society.

The Society is thankful to all who have worked to promote the cause of Wild Life Preservation in the country and thus save our precious national heritage for posterity.

ESTIMATE OF INCOME & EXPENDITURE FOR THE YEAR—1965-66
as approved by the Executive Committee.

INCOME			EXPENDITURE	Rs. P.
<i>Members</i>		Rs. P.		
1. Patrons	1000.00		Office Salaries Establishment, etc.	1800.00
2. Life Members	1000.00		Advertisement and Publicity	250.00
3. Ordinary Members	1500.00		Printing and Stationery	300.00
4. Institutional and Affiliated Members	600.00		Postage	400.00
5. Professional Members	150.00		Rent and Tax	900.00
6. Educational Members	200.00		Electric, Water and Conservancy	200.00
7. Students Members	600.00		Entertainment	150.00
Pads, Buttons, Ties	200.00		Contribution to Assam Branch	100.00
Balance of Nature Game	100.00		Contribution to Bihar Branch	100.00
Donations	1000.00		Miscellaneous	100.00
Interest on Deposits	500.00		Bank Commission	150.00
			Audit Fee	100.00
			'CHEETAL'*	2900.00
Total ...	6850.00		Furniture	400.00
DEFICIT ...	1500.00		Books and Magazines	500.00
Total ...	8350.00		TOTAL ..	8350.00

***'CHEETAL' Account**

Printing	... Rs. 3500.00	} Rs. 4000.00
Postage	... Rs. 500.00	
Less		
Advertisements	... Rs. 300.00	} Rs. 1100.00
Sales	... Rs. 800.00	
TOTAL	... 2900.00	

Wild Life Preservation Society of India

VOL. VIII

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No. 2

Ourselves

In the last issue, we referred to our catalytic role in the Cause of Conservation. It is a pleasure this time to record that much is finally beginning to happen on the wild life scene in India. It almost seems as though there is something very right with this country, for even while we have been denigrating our state administrations who are charged with wild life and forests as their responsibility under the Constitution, our own efforts and those of other organisations seem to have caught on. The impulse, it must be recorded, seems to have emanated from the Planning Commission, and the sage personnel charged with Natural Resources in those august corridors of power and planning.

A high-level conference was held in April this year, at which a consensus of opinion on action necessary was drawn. A fuller report of the Conference is appended elsewhere. Here we wish to congratulate the Planning Commission and those responsible for canalising the impulse to change which led to the acceptance of the need for the reconstitution of the Indian Board for Wild Life.

Following soon upon this, in early June, came another meeting of the Indian Board for Wild Life at Dhikala, in the Corbett National Park. A report of that meeting is appended, too, and much useful work seems to have been undertaken.

In the states, too, the fever caught on, and meetings of State Wild Life Boards took place in Gujarat, Rajasthan, Assam, Uttar Pradesh and elsewhere, where some effort was made to think along scientific and practical lines, by establishing pilot-projects, more sanctuaries, etc.

We would like to emphasize once again that even if the states rise to the occasion as they seem to be doing now, we must have some central control and direction on matters of over-all policy. We must have standardised wild life legislation, scientifically calculated

shooting-seasons, fees and procedures for the penalisation of culprits against the rules. We must have wild life management courses at our Forest Research Institute and Colleges; and we must have a comprehensive survey made of India's wild life resources as they stand to-day, with the help, if need be, of 'imported' experts.

We must have, too, institutionalised procedures for inducting the services of honorary, and honorable, amateurs in wild life work as wild life wardens and advisers. And, to conclude, we must have at least one comprehensive and reliable and well-produced-and-written text-book on Indian wild life in all Indian languages, which would be made compulsory reading at schools all over India.

To continue with a record of our activities in the last six months, apart from the Administration's efforts recorded above, we are happy to record some field work done by members of the Society.

The Himalayan Wild Life Research Project, apart from taking a crash-programme of the needs of wild life at high elevations to various authorities concerned, including Army Commanders, has organised three successful trips after rare and vanishing species. Unfortunately, the tranquilliser-gun equipment needed by the Project has still not been obtained, and the only progress made has been by way of estimates and rough distribution charts and maps of the various species. A more ambitious expedition is now being organised for the ten summer-weeks of next year in Garhwal, where it is hoped to obtain photographs and other data about the snow-leopard, the 'burrhel', the musk deer, 'thar', red bear and avi-fauna. It is expected that the Life news magazine will play some part in this expedition by helping with equipment and film.

Some progress has been made in the collection of photographs and the compilation of facts and information for the possible production in future of a text-book on wild life for Indian schools.

So far, response from members to our appeal for more information and photographs has been poor, and it does not seem likely that we can convert 'Cheetal' to a quarterly journal for some time to come.

Though fresh members keep on being enrolled by the Society, there is a sad and constant drain on our membership through forgetfulness and lack of enthusiasm from our student-members, who often fail to renew their membership on leaving school. A large number of student members was enrolled after last year's drive, when a member of the Executive Committee toured all the good schools of India, showing films and giving talks on wild life

and the Society. Of these, many have become delinquent members, which is a sad commentary on the durability of the enthusiasm generated by these tours.

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An eminent wild life ecologist from the United States has advised us that 'Cheetal' and all wild life workers in India, should strive to be more precise and scientific in their treatment of the subject. He contends that most of our work, and the material published by 'Cheetal' is vague and impressionistic, rather than factual and scientific. We realise the point is valid. We are trying to make our articles more statistical and less amateurish, but we will have to maintain a balance to satisfy the varied demand that 'Cheetal' tries to fulfil, from sportsmen as well as conservationists, often, but not always, the same.

Editorial Notes

International Assistance for Indian Wild Life :

A meeting of the International Union for the Conservation of Nature and Natural Resources, an organisation with its Headquarters in Morges, Switzerland, which is doing wonderful work as a world-wide agency for conservation work in a form of unspecified collaboration with the World Wildlife Fund, is to be held in New Delhi towards the end of November.

We hope that the Indian Government and departments concerned will try to utilise this valuable opportunity to arrange some sort of assistance from International Organisations like the Food and Agriculture Organisation, the World Health Organisation, and others, to fulfil the needs of wild life work in India. Such international aid has been forthcoming in generous measure to other countries, especially in Africa, where better publicity and centralised planning have made the task of wild life workers easier. One has only to know of the vast amounts which have come to Kenya and similar nations for the establishment of colleges and courses of study, for conservation work, to realise how behind-hand and naive we Indians have been in obtaining similar assistance and, be it confessed, in utilising it even when it might have been obtained.

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We should like to use these pages to congratulate heartily one of our very active members and supporters, a versatile and eminent wild life ecologist, Dr. George Schaller, for his

collaboration in the magnificent article on the Tiger which appeared in a recent issue of Life news magazine.

Those who are familiar with Dr. Schaller's book on the Gorilla will need no introduction to this rising star on the conservation horizon. He spent a year studying Gorillas in Africa, and has only recently left India after finishing one year's study of 'cheetal' in India. We hope to see his report published as a book, for he has done valuable and original field work on several of our big game species, though the results are not yet open for publication. We hope, too, that it will be possible for Dr. Schaller to come to India again since we can use his knowledge and talents to start the science of conservation and wild life management in our own country.

Never have such magnificent photographs ever been taken of the Tiger, and we find for once, the efforts of Dr. Champion matched and surpassed, though the photographic equipment employed must have given the Life-photographer a tremendous advantage over the pioneer tiger-photographer from Uttar Pradesh.

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The Jawahar Institute of Mountaineering :

The U.P. Mountaineering Committee, convened at the instance of the Chief Minister, the Hon'ble Mrs. Sucheta Kripalani, met in Lucknow in July, and the details of a mountaineering Institute for Uttar Pradesh were sorted out.

It was decided to found this Institute at Uttarkashi, in Uttarkhand Division, beyond Tehri and Dehra Dun. It is a border district on the route to the pilgrimage of Gangotri.

The Committee, under the Chairmanship of Brigadier Gyan Singh, then met once again in Uttarkashi early in August, and selected a site some six thousand feet above sea level, in a forest of pines, on the ridge leading to the summit of Thadol, a mountain above the tree-line, over thirteen thousand feet in height, and located above Dodi Tal.

Our Editor, who was on the committee, had recommended that wild life research on high elevation fauna should be an integral part of the activities of this institute, and with the valuable help of the Chief Conservator of Forests, this proposal was passed by the Committee in Lucknow. It is hoped that a wild life research programme can be worked out in collaboration with the Himalayan Wild Life Research Project, and we look to the attachment of a qualified zoologist trained in wild life work to carry on the work at the site of the Institute. It might even be possible to start a high altitude zoo at the Institute.

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Zoological Gardens in the Mountains :

There are now functioning zoos at Darjeeling, Simla and one under construction in the Governor's grounds at Naini Tal, being founded under the able guidance of Raja Bajrang Bahadur Singh Bhadri, who was the motive force behind the zoo at Simla in Himachal Pradesh during his tenure as the Lieutenant-Governor there.

This raises again the question of expert knowledge and counsel. We know that we have a large number of qualified zoologists in India, but will they be able to do the field work and actual wild life management that the care and maintenance, what to speak of the founding, of a zoo requires ?

The Uttarkashi Institute will be fortunate, perhaps, in having the Wild Life Society Headquarters so close to it, so that we will be able to offer it whatever assistance and information we dispose, but what of similar zoos in Darjeeling and elsewhere. We believe these zoos are 'high-altitude zoos' only in name. The species represented at them are mostly fauna from the plains or exotica presented by visiting dignitaries. It is to be hoped that the Indian Board for Wild Life, when finally re-vamped and better-equipped, will be able to impress itself on these wonderful new projects.

Census Techniques in Wild Life Management

By

J. JUAN SPILLET AND GEORGE H. KELKER*

SUMMARY

We have discussed briefly a few of the basic factors to be considered in conducting a wild life census. Terminology and the application and basic computations for the Strip Method have also been briefly considered. In no way should this paper be considered a complete treatise on wild life census methods, nor the methods discussed as inviolate rules to be strictly adhered to in all cases. Sound judgement must be exercised and some experimentation is necessary in conducting all wild life census work. It should be constantly remembered that a single census does not provide all the answers for a wild life conservation program. Only by carefully and continuously collecting and analyzing such data over an extended period of time can definitive conservation measures be applied to preserve and protect one of India's priceless natural resources—its irreplaceable wild life.

A census is an enumeration of animals on a given area, at a particular time, by a method the results of which may be analyzed statistically. The management of wild life is based upon a knowledge of numerous factors, two of the most important of which are: (1) kinds of animals (qualitative factors), and (2) numbers of each kind (quantitative factors). Several census methods are available to compute directly the total numbers and the relative proportions of adult and yearling males and females and the number of young. Such data may show gains and losses as well as the success of the mating season as measured by the annual production of young.

The manner of conducting a wild life survey depends upon: (1) the species being censused, (2) the topographic and vegetative conditions of the particular area, (3) the recency and adequacy of any previous surveys, (4) the availability of trained personnel, and (5) the intensity of management planned for the future. The greater the intensity, the greater is the need for increasing the thoroughness of the census. Each of the numerous census methods has advantages and disadvantages.

Wild life populations do *not* remain static. Increases or decreases often occur rapidly and a single census rarely provides answers to questions about several aspects of the popula-

*Mr. Spillett is presently conducting ecological research in India under the auspices of The Johns Hopkins University Center for Medical Research and Training, Baltimore-Calcutta and Dr. Kelker is professor of Wild-life Management at Utah State University (Logan).

tion. Therefore, data should be collected and analyzed continuously in order that current conservation measures may meet the demands of changing situations. In short, an accurate census of the total wild life population is essential in any conservation program, but it is also one of the most difficult tasks to perform. We shall now consider some procedural aspects of conducting a census.

General Considerations: The primary qualification for personnel to conduct a census is the ability to readily identify animals in the field to species, sex and relative age class, i.e., adult, yearling or young of the year. The importance of animal activity, as well as those factors causing variation in activity, must also be recognized. Included are such factors as: the species to be counted; time of day; weather, including temperature and relative humidity; seasonal habits; and breeding activities. For example, blackbuck commonly inhabit open grasslands, whereas sambar are found in forests; most ungulates tend to feed during early morning and evening hours and rest during much of the day; however, when it is cloudy many animals feed later in the morning than when it is clear; storms or sudden changes in the weather also affect the animals' patterns of activity; some species follow seasonal patterns of migration, which must be considered or the species may be absent from the census area, or appear overly abundant. However, migratory species such as the Kashmir stag, or species such as swamp deer and chital that group together during the breeding season, may present the advantage of conducting a direct count (See Direct Counts).

While field glasses are almost essential, a lack thereof should not deter a determined investigator. The number of people conducting the census must be considered so that each member of the group is sufficiently trained and instructed to insure that the census will be coordinated and will be conducted in an efficient and orderly manner. However, for ease in presentation, it will be assumed throughout this paper that one person is conducting the census. If more individuals are to be employed simultaneously in the same or adjacent areas, necessary modification or allowances will have to be made to avoid duplicate counts of the same animals. The drive is one of the few methods using much manpower.

Terminology: The need for a common language for communicating the results of a census was recognized by Wight (1931) who stated:

One of the basic problems in game management is the development of methods by which a game census may be rapidly and accurately made. A satisfactory method must be quantitative and standardized and the results should be expressed in birds-per-acre for each cover type and season.

Some common terms used in conducting a census are : (1) head, considered merely as one of a number (i.e., ten head of chital), (2) animal density, the number of animals per a given area, (3) relative abundance, a measure or indice used when density cannot be determined (i.e., "abundant", "common", "rare", etc.) or time-relative (i.e., animals seen per hour, etc.) or the percentages of various kinds seen, (4) cover map, a map depicting the different types of vegetation on specific areas, (5) cover type, a broad classification of vegetation types (i.e., desert, grassland, forest, etc.), (6) vegetation type, an easily recognized biotic community (i.e., an evergreen, sal, bamboo or mixed forest, etc.), and (7) cruise, to systematically cover an area, generally by moving hither and thither.

The various ways of expressing the density of one or two species on a given area and also their combined abundance is presented by Hill and Kimball, 1948 (Table 1).

Table 1

Various ways to express the density of animal populations. Expressed in total numbers.

Form of expression to indicate density	Total density	Density by Species	
		Species I 40%	Species II 60%
Acres per animal ...	25.00	—	—
Animals per acre ...	0.04	0.016	0.024
Animals per 100 acres ...	4.00	1.60	2.40
Animals per sq. mile (640 A.) ...	25.60	10.24	15.36
Animals per 1,000 acres ...	40.00	16.0	24.0

Direct Counts : The most desirable type of census and the most accurate is a direct count of all the animals inhabiting the census area. This is sometimes possible with species that normally inhabit or visit open grassland or desert areas or which congregate into large herds during certain seasons of the year. For example, the blackbuck and the gazelle (chinkara) commonly inhabit open and flat country. With the aid of field glasses, or preferably a 20× spotting scope, very accurate counts of animals in these areas may often be made. On several occasions while Dr. George Schaller and one of us (J.S.) were conducting a wild life census of the Keoladeo Ghana Sanctuary near Bharatpur in February, we were able to count the entire population of blackbuck. Amittedly, this is a small herd. However, during

a two-year study of the pronghorn antelope in the deserts of Wyoming (USA), the same author has made accurate counts over extensive areas and of herds numbering over 200.

Some species, such as swamp deer and chital, frequently congregate on open meadows or "maidans" during certain seasons of the year. For example, in Kanha National Park the swamp deer are all on the maidan adjacent to Kanha village in March and April. In July most, if not all, of the chital in the Kanha valley congregate in a few large herds on the same maidan. During these months, one person, working for several days, might obtain accurate counts of both species. The Kashmir stag winters in a relatively restricted area in the Vale of Kashmir east of Srinagar. A direct count of this species could be made there in winter. However, in many situations and with many species it is neither feasible, nor possible, to make a direct count of every animal in an area. Under such difficulties other systematic methods which lend themselves to the terrain and the species being surveyed should be used to obtain the most accurate estimate of the population, or its components.

The Strip Method: Numerous census methods are described in the literature, which involve complicated mathematics and which were developed for a particular species under relatively specific conditions. However, the majority of these are based upon, or are modifications of, the Strip Method.

In principle the Strip Method is identical to the forester's method of cruising timber, that is, the number of animals counted on the strip is considered to be directly proportional to the total number, as the area of the strip is to the total area. The principal difference, however, is that the timber cruiser decides on the per cent of the total area to cruise *before* entering the forest; and then calculates the width of strip necessary to give the area needed, the length per section being known; whereas the animal "cruiser" determines the width of the strip *after* returning from the field by one of the methods described below. Furthermore, the timber cruiser maps each different forest type as he tallies the trees, and notes the number of chains (yards or other measurement of distance) covered in that particular type. Similarly, the animal ecologist should record the vegetative types encountered along the strip. It would be better, if possible, for him to have a map showing the vegetative cover before he enters the area, and to plot the location of the animals seen on this map. A "cover map" is almost indispensable for census work. When animals sighted are plotted on this map, it not only shows the preferred distribution of each species by vegetation types, but it also shows the relative frequency by which a species may be encountered in these types during that particular time of year.

The principle of the Strip Method may be expressed by the following equation :

$$\frac{\text{Area of the strip covered}}{\text{Total area of censusing}} = \frac{\text{Animals on strip}}{\text{Animals on whole area}} \quad \text{or} \quad \frac{a}{A} = \frac{h}{P} \quad \text{Formula I}$$

- (1) $\frac{a}{A}$ gives per cent of area surveyed, or "per cent of survey".
- (2) $\frac{a}{h}$ gives the number of unit areas per animal
- (3) $\frac{A/a}{hP}$ gives the number of "animal-squares" in the whole area
- (4) $\frac{AhP}{a}$ (derived from 3) gives the total estimated population for the given area.

$$\text{Therefore, (5) } P = \frac{Ah}{a} \quad \text{Formula II}$$

But $a = \text{length of strip times width or } g \times w$

And $w = 2$ times the flushing distance (right angle distance of the animal from the line of travel followed by the censor), or $2D$

Therefore, $a = g \times 2D$

Substituting in Formula II for a

$$P = \frac{Ah}{g \times 2D} \quad \text{Formula III}$$

This explains King's formula where A is given in square yards,
 g is given in linear yards,
 D is given in linear yards, and
 h is number (head) of one species seen

While feet, chains, rods or other measurements may also be used, this complicates the arithmetic. However, it is usually more convenient to at least keep the flushing distance in yards, because a yard is approximately a step for most people for distances under 100 feet.

An equation which is easier to use is the following:

$$d = \frac{8 My}{11 h} \quad \text{Formula IV}$$

where d = density in terms of acres-per-head for the district surveyed

h = number of head counted

M = number of miles in the transect line

y = number of yards the animal seen is from the transect line, or the flushing distance
(See Recording the Flushing Distance)

Thus, the total population estimate for the total area expressed in acres (A) is : $P = \frac{A}{d}$ Formula V

Note that y is the chosen flushing distance that includes all of h head. Yet, y is rarely that greatest distance at which some animals are occasionally seen (See Computing the Animal Density).

Recording the Flushing Distance: There are two distinct ways to record the distance of the animal from the censor. One method is to record the distance from the spot vacated by the animal at the time of disturbance to the spot where the censor was when he disturbed the animal, frequently called the *long distance* or "radius of disturbance". The second method is to take the shortest distance from the censor's path of travel to the spot just vacated by the animal. This is the perpendicular or right angle distance to the line of travel, frequently referred to as the *short distance*. This is distance y in Formula IV.

Although some authors advocate the use of the *long flushing distance*, it has disadvantages which may be over come by using the *short distance*. A criticism of this method is that the observer, by moving along the transect line or line of travel, will lose sight of the exact spot where the animal starts or flushes, or, alternatively, if he goes directly to that spot and paces back, he may miss his line of travel. Therefore, skill is required and only persons having sufficient training and who show special aptitude should be allowed to perform this basic operation in wild life management. Both the beginner and the more experienced worker, particularly in densely forested areas, should carry a compass in order to check, at least periodically, the line of travel and to avoid overlaps or "skips" in their transects. The beginner may also use a compass to take the angle or line on which he flushed animals, and pace the distance directly. This is an accurate but time consuming method for obtaining the short distance, the justification of which is probably restricted in most cases to research.

Computing the Animal Density: To determine the acres-per-animal ratio, the count of animals and the area of the strip surveyed must be known. The length of the strip should be known. Then, the width may be determined by one of the following methods:

1. Use the maximum distance recorded for either side.
2. Average all flushing distances.

3. Halfway point between maximum distance and averaged distance.
4. Use several intermediate distances (i.e., between zero and maximum), and choose one which seems to give the best sampling.

The advantage of the first method is that it requires the least arithmetic. Its disadvantage is that it almost always gives an underestimate. It is probable that some animals near the maximum flushing distance recorded are never detected. Other conditions equal, the maximum distance at which various species are seen is influenced mainly by the kind and density of cover.

The second method is easy and convenient. It averages discrepancies and smooths out irregularities due to variations in cover conditions. However, its principal fault is that it usually overestimates the population, since all animals beyond the average flushing distance are included *inside* it. It may be argued that for each animal seen beyond the average flushing distance, there was one missed inside it. This is a fallacious argument. The shorter the distance an animal is from the censor's line of travel, the less probability that the animal will not be seen.

Perhaps the third method, or halfway point between the average of all flushing distances and the maximum flushing distance, will give a good estimate of the number of animals of one species on a strip. However, with great variations in cover (i.e., forest versus maidan) the population may be overestimated or underestimated, depending upon cover conditions. Therefore, the fourth method is generally recommended.

The fourth method requires the most computations, but demonstrates the flaws in the assumptions made by the first three methods. It is also difficult to choose the width which gives the best sampling estimate. Several widths at which animals were recorded are arbitrarily chosen and only those animals seen inside each of the widths are included in each width classification. Thus, there is a larger number of animals included as the width is increased, but the increase in ratio between animals and acres is not proportional. Therefore, by using a number of different computations or width classifications, it is frequently shown that method one gives an underestimate, method two an overestimate, and method three perhaps either an underestimate or an overestimate of the population.

The advantage of this method of calculating population density is that the extreme distances are omitted, thereby eliminating the variation in cover, as well as in individual animal responses. It shows validity of sampling by agreement or disagreement of the ratios.

The disadvantages are : (1) it is more time consuming (but this fault should be disregarded if one wants the best survey possible), and (2) personal judgement is involved in choice of ratios of acres per head. This latter fault is immaterial if the ratios agree closely. However, if they are not in close agreement, it indicates that the sampling of the population was insufficient, and that any flushing distance used, whether it is the average of all, or is the maximum, is only a guess. Therefore, it is advisable to repeat the survey if important plans are being considered. Even if a survey is not repeated, this method will show a possible maximum and a possible minimum limit of the population. An example of this method is given below (Table 2).

Table 2

A count of deer in a paddock in Ontario, Canada.

Distance Deer were seen from line of travel	Total No. Deer seen inside that distance	Acres per head of deer	Estimated population per square mile
125 yards	36	9.24	70
75 yards	34	5.85	110
50 yards	33	4.00	160
35 yards	26	3.545	180

Based on these data, the minimum density appears to be 70 deer per square mile and the maximum density 180 head. Obviously, this range is too wide and the survey should have been repeated.

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Humane Destruction of Elephants

By

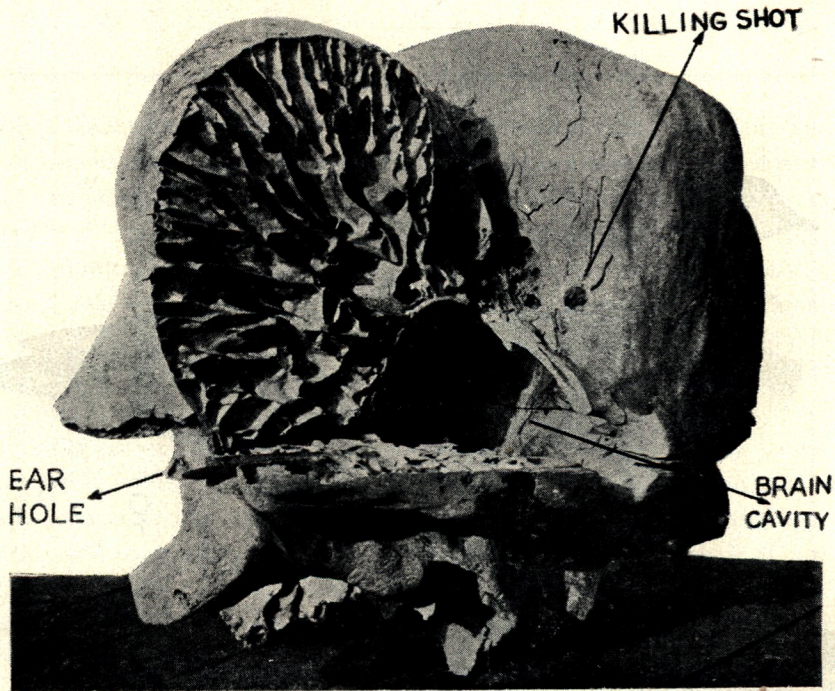
P.D. STRACEY

The problem of the wild elephant is daily assuming increasing importance in certain parts of India. With the disappearance of the princely and zamindar classes, the increased tempo of mechanisation in forest and timber exploitation, as well as the wide-spread use of the mighty jeep and its larger cousin, the 4-wheel-drive truck, there is little use for the domesticated elephant as a 'vehicle'. On the other side of the picture is the prolific breeding rate of the elephant in its natural state.

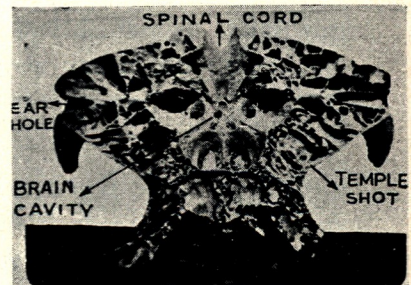
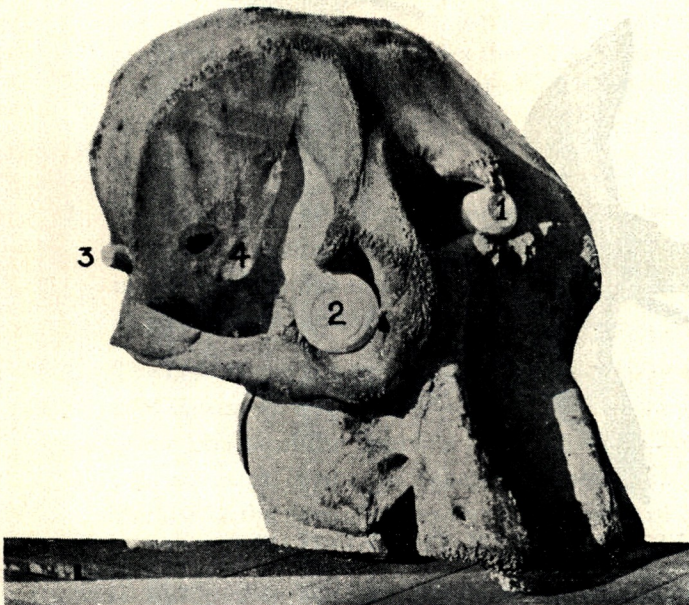
In the U.P. it appears that the elephant, through its rapid increase in recent years, has at last attracted the attention of the authorities and a decision has been taken to destroy elephants through the medium of adequately armed sportsmen. In Assam and Bengal, where elephant catching has declined, particularly since the war, the problem of the crop-raider and marauder in certain areas is acute. In South India, also, with the increasing destruction of the forests of the Western Ghats and with the submergence of large valleys for dams, particularly the famous Khedda site of Mysore, elephant herds have to face a daily increasing reduction of their range, and the problem of dealing with the troublesome elephant is assuming importance.

While the average person is indifferent and the average official is callous to the deteriorating position, the thoughts of every wild life conservationist worthy of the name must go out at this critical juncture to the unfortunate elephant, which has served man on the Indian sub-continent so faithfully for thousands of years. These same conservationists must, however, face the writing on the wall, which is that the days of the elephant as a servant of man are numbered. From now on the question will assume a different aspect—how to cope with the increasing herds, how to ensure their satisfactory control and most important of all how to humanely destroy the troublesome elephant when no other solution is possible. That some elephants have to be destroyed in the interests of their class as a whole and of the human race in India, is a hard but obvious fact which must be faced. No amount of sentimentality on the subject will help us. I yield to no one in my love and admiration for this wild and magnificent creature and I have undergone many agonising moments at descriptions of attempts to shoot elephants. Some have been by mere trigger-happy sportsmen and amateurs eager for acquiring the reputation of an elephant-hunter and of a pair of elephant tusks; others by serious shikaris, quite ignorant of how to set about it but indifferent to the elementary duty of acquiring a knowledge of how to kill an elephant humanely.

SHOWING BACK-OF-THE BRAIN SHOT



Rear View of Skull showing Brain Cavity.

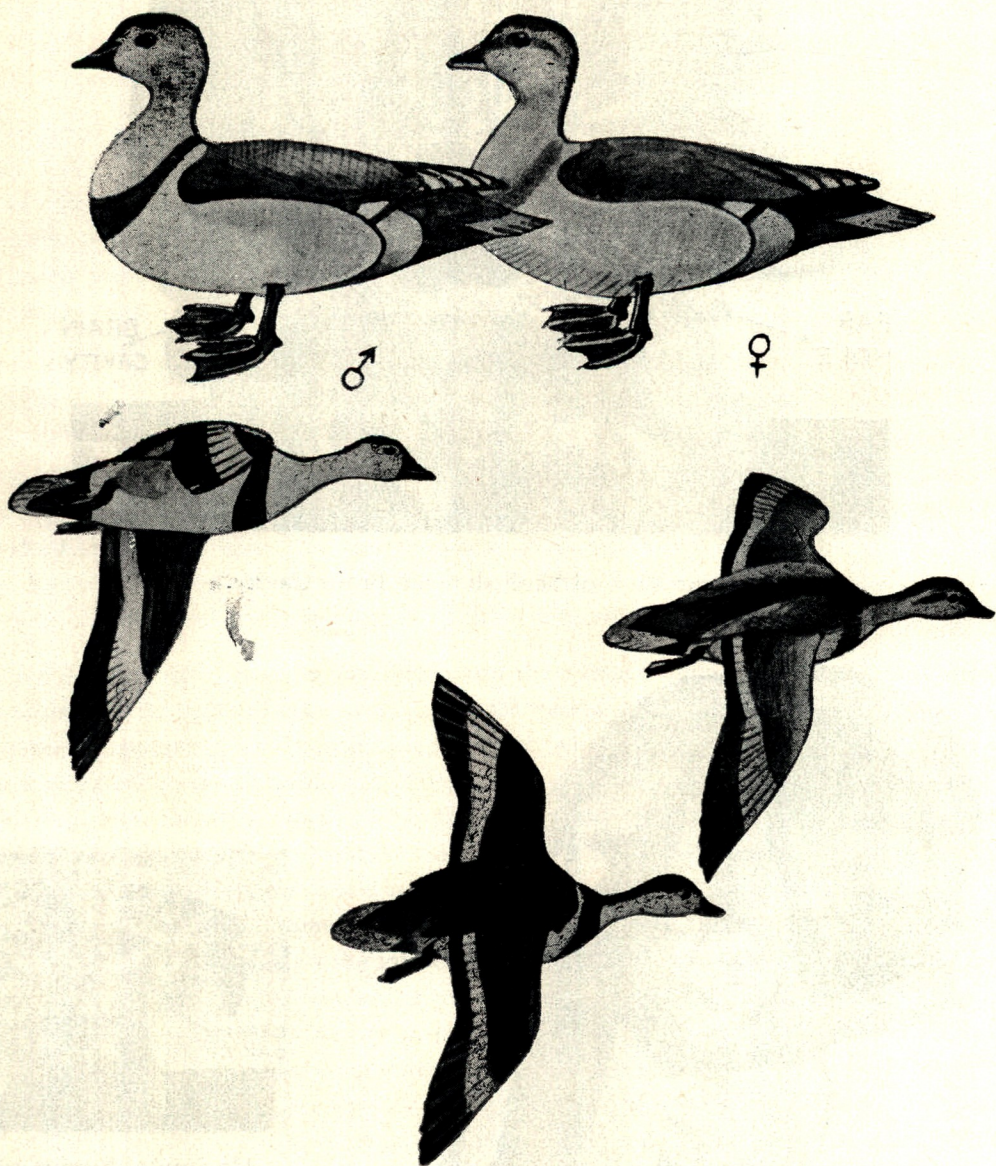


Horizontal Section of Skull.

ELEPHANT SKULL IN NORMAL POSITION

1. Frontal Bump, 2. Eye, 3. Ear, 4. Temple Shot.

(For reference, please see Page 14)



"THE SMALLEST DUCKS IN THE WORLD"

(For reference, please see Page 18)

When I was a young forester and had taken up elephant control at the behest of my *guru*, Milroy, the then Conservator of Forests in Assam, I made my mistakes as well as the next man and I was often nauseated at the results. That I was not alone in this was revealed to me one day when talking it over with a much more experienced and successful elephant hunter than myself. The mutual discovery was that neither of us knew where precisely the brain of the elephant lay! We were both of the opinion, as every self respecting elephant hunter should be, that only the brain shot counted and only that shot should be taken by anybody attempting to kill an elephant. The rest of it, we agreed was sheer butchery. And so we got a hold of an elephant's skull and cut it up with a two-man cross cut saw. To say that we were surprised at the correct position of the brain as opposed to the popular conception of the same was to put it mildly. From then on I became a student of the anatomy of the elephant's head. I repeatedly cut up skulls of dead elephants and examined them with respect to the external contours of the skull, measuring and comparing with a live elephant, my Mohan Prasad, standing by until I was word perfect as to the shots to be taken to reach the brain. Photographs which I took twenty five years ago are reproduced here for the benefit of my readers and in the interests of the elephant.

To summarise, I venture here to lay down a few axioms for the average sportsman taking up elephant hunting.

1. Never attempt an elephant until you have a sufficiently powerful and heavy rifle. Double rifles of .400 bore and upwards using modern powder cartridges are to be preferred. Of the single rifles the .423 Mauser is the very lowest limit. The small-bore high-powered rifles are only for the real experts. It is to be remembered that it is the stopping power of a rifle which counts with such a large and powerful animal.
2. No shot should be taken at more than fifty yards at the outside, though thirty yards is more the desired distance. This may seem as merely a challenge to the sportsman's *guts*, but this is a game which calls for courage and the nearer one gets to the elephant the more the chances of success.
3. The best shot is the temple shot. To pin-point this accurately it may be described as a shot at an angle of 45° to the direction in which the elephant is facing, at a spot in the hollow of the temple a little above the line joining the ear-hole with the eye. A good mark is the protuberant cheek-bone of the elephant, which is even more marked in the case of males by the discolouration caused by the exudation of the musth fluid.

4. The frontal bump shot is not to be trusted, as apart from the opening and the passage being small the entry of the bullet to the brain can be vitally affected by even a slight movement of the head and by the position at which the latter is carried, leaving aside errors caused by differences in levels between the positions of the sportsman and the quarry.
5. The so-called ear shot is the least likely to achieve success. The thickness of the wall of cellular bone surrounding the brain is maximum along the axis of the ear holes and minimum at the temples (as can be seen from the photograph).
6. The back-of-the-brain shot illustrated in one of the photographs is only to be taken when the elephant is down but not dead. For this the sportsman must go right up to the animal as it is lying down and fire a bullet into the back of the skull, at the point where the mahout usually applies his goad, i.e., where the two lobes of the skull fall away below the neck.

This shot is to be taken with the rifle pointing parallel to the front legs and to the trunk of the elephant when held in the normal position, i.e., straight down towards the ground. The best way of taking this shot is to squat down behind the head of the elephant, with the rifle held close to the back of its skull. If this description of the shot is considered to be too much of a challenge to the average hunter, I would again stress the fact that this game of elephant shooting is not for the timid person.

7. Finally, and this is the most important of all, no one should attempt to tackle an elephant unless he has studied pictures of the position of the brain and preferably examined a dissected skull of an elephant thoroughly.

The Rapture

(Inspired by the recent tracking down of a rogue elephant)

There is a rapture where the saplings close,
There is a thrill among the whispering woods,
There is a pulse within the poet's soul, those
Moments lie transformed into unearthly moods !

Where fringed with emerald, fresh with winter rain,
Where flushed by dusk or damped by early dew,
Where pain and pleasure fused, the lovely twain,
To stir the souls of those who see, those few !

Who can divine the wonder in an awesome fear,
Who can divine the rapture of an aching bone,
Who can divine the very love which bears,
To hurt the blood and light the very soul ?

Which state can stir the seven rings of space,
Which field can nurse the triple beat of awe,
Which glory can unbind the human race,
And set the soul on clouds to soar and soar ?

This is the anvil which the eye of man divines,
This is the wave the spirit of man may dare,
This is the world beyond the world's confines,
Which makes a man a giant and his soul of air !

Higher and still higher the burning flame must soar,
Higher and higher till height makes pain and pleasure one,
Higher towards the stars and soaring evermore,
Till man and his small pulse may meet the pastures of the sun!

Alfred Raoul Hasan Imam.

For the Wildfowler—III

'THE SMALLEST DUCKS IN THE WORLD'

With the exception of the Hottentot Teal of Africa, a dabbling duck, the Genus *Nettapus* (Pygmy Geese) of the 'Perching duck' group are the smallest members of the family Anatidae, ducks, Geese and Swans. Their tiny Brant-like bill which much resembles that of the Sheldgeese has suggested their English Vernacular name, but unlike geese, they have such short legs they can hardly progress on the ground. Their plumage is mostly green, grey, black and white, the sexes slightly but clearly different. The downy young are funny little things, made so by having a long, rather stiff, tail. We in India find one member of this Genus living here, the Cotton Teal or Indian Pygmy Goose; Australia has a sub-species like our Cotton Teal, but larger, and the Green Pygmy Goose; Africa has the most elegant of this group, the African Pygmy Goose with its orange bill, brick red flanks, white and green head and dark back and tail.

The Cotton Pygmy Goose, or Cotton Teal, *Nettapus coromandelianus*, an Asiatic Malaysian species is more slender than the other two and has a weaker, flatter bill. It also differs in having a conspicuous change of plumage in the male according to the season. It has a wide range over Southern and Eastern Asia and Malaysia and a larger sub-species in N.E. Australia as mentioned above.

In India, Cotton Teal, the smallest of all ducks, are common in many areas particularly Bengal and Assam, moving towards the north in the summer months, and south in the winter. They become very tame when not molested and are found particularly on ponds, and in flooded paddy fields near villages or towns. They have been known to nest under roofs, finding there safety, and an acceptable alternative to holes in trees. Their migration is rather remarkable for a low flying bird, often covering great distances especially those in China. The flight is fast, rising somewhat awkwardly, but they twist about among trees with remarkable dexterity.

Like other Pygmy Geese, Cotton Teal feed preferably upon floating vegetation, small seeds and tender leaves mostly during the day, roosting in trees or even rooftops at night. If pursued or wounded they dive continually and easily. They swim most of the time, when not at rest, with quick jerky movements picking up their food rather like Coots. They walk slowly and tend to tumble down if hurried often lying on their breast to rest. The voice

of the drake is a rattling metallic "Dikidi Duk, Dikidi Duk", heard mostly when they are on the wing. The duck is usually silent but can utter a weak squeaking note.

Description : Indian Cotton Teal : *Nettapus coromandelianus coromandelianus*.

Male : Head and neck white, with the forehead, crown and a thin circle round the eye black; a broad black and white collar on the upper back and breast; back and mantle dark glossy green; quills black and white, the white forming a large band across the wing. Tail black; coverts as well as the sides of the body, white peppered with black and washed with grey; the rest of the underparts white. Iris red; bill black; legs greyish green or black. In eclipse plumage the drake resembles the female; but the mantle and wing coverts are darker. The wing markings remain the same.

Female : Crown blackish brown with a dark line through the eye, rest of the head, neck and lower parts white spotted and mottled with black; upper parts as in the male but brownish, and the white patch on the wing much less noticeable. Iris brown, bill brown and yellowish below; legs as in the male.

In captivity under suitable conditions Cotton Teal live fairly well but although large numbers are caught every year they seldom survive as they travel poorly and need special care. Also one has to keep them completely enclosed because they don't usually survive if pinioned. I have seen them in both England and Holland but in both places they were in large enough covered enclosures to be able to fly about freely. Also because of their small size they don't do well with other larger species of duck unless free to move and feed unmolested. On the other hand should it be possible to make suitable arrangements they are most decorative and interesting birds to keep, or even encourage to visit a nearby pond which may easily be observed.

Falconry—The Sparrowhawk-I

By

S.M. OSMAN

Though Haji Ilyas is the actual originator of this scheme, the method of Training a sparrowhawk within 3 days of its capture comes from the famous treatise of Khuda Yar Khan Abbasi. To begin with, a drug is compounded from equal quantities of the following ingredients. I. *Datura Alba*, II. *Cannabus Indacus* and III. oil of almonds. When mixed together they form a sort of paste and this is further rolled into pills, each pill to the order of $\frac{1}{8}$ of an inch in diameter. The newly-caught-hawk is given one pill at a time every 3 hours. The effect of this treatment is a total stupefaction of the hawk, making it regardless of its surroundings. "*Cannabus indacus*" is known for its hunger-inducing quality. So the hawk is perpetually in a hungry state and apparently unafraid. At short intervals sparrows are brought before the hawk and these it is made to kill. After every kill the hawk is rewarded with a little meat from the sparrow it has claimed. Also it is encouraged to jump to the fist by luring it with bits of meat held by the falconer.

The process of training goes on night and day till on the 3rd day the hawk is so bemused that it has totally forgotten its former way of life and has fallen into the mechanical stride of attacking and killing any small bird shown to it. The habit is so deeply instilled that the process of killing birds, and jumping to the falconers gloved fist, become the hawk's second nature. Now the hawk may be safely slipped at game such as quails or the barn owl and barring accidents, a kill is assured. Nevertheless the hawk is fore-doomed. The cumulative effect of the drug has by now built up to such a lethal dose, that a rapid and violent reaction follows within a day or two and, the hawk dies within a few hours of this.

While glancing at the attitude of our old-time falconers their methods of training become, at once, too painfully inhuman, and call for comment. For of all methods imposed by man in the training and subduing of either—man, or bird, or beast, the most obvious, the most universal, and the most severe treatment has always been shrouded in a yellow hue of cruelty. We have seen without debating, the result of harsh treatment when the unfortunate hawk has fallen a victim to such brutal penalization and, how it has met a tragic end. With our wider experience we are lead to revise all such semibarberous approach and we come to the avowed understanding that we should never indulge in such mousterous short-cut methods of training.

However, no phase of a hawk's training should ever be treated as an insignificant fragment in the course of the bird's education. As a matter of fact the whole programme should be treated as a challenge which ought to evoke a huge response within the mind of the falconer, and in sketching a plan for this operation, we must always keep in mind, as already stated—that no two living birds are exactly alike, but this fact in no way invalidates the main fact that a sparrowhawk like any other bird, is a member of a class and hence comparable with other members of its tribe in as much as is covered by the classification. The impact of training should always be in earnest and close attention, at all times be paid to the hawks' response to the stimulus of this training. In relation to the size and age of the hawk, a sense of proportion has at all times to be kept in mind. Training should proceed step, by step, and at no instance should the hawk be expected to assimilate more than what it normally is expected to absorb. For in the words of Plato "If one sins against the laws of proportion and gives something too big to something too small to carry it—too big sails to too small a ship, too big meals to too small a body, too big powers to too small a soul—the result is bound to be complete upset."

The markings and colour of a sparrowhawk are indeed a Store-house of vital information and a decisive factor in the future course of training to be chalked out by the falconer. Correct interpretation will at once reveal the good and bad points in a hawk. Assuming the hawk to come under the category of a certain age group it is then possible to discuss the general concept of training recommended in this particular case. Generally birds of a higher age group will require a different and a slightly more stiff approach to the problem of training. Local migrants that have been snared early in October are usually immature birds that have wandered into the falconers' Trap.

Let it be taken for granted that our heroine is an immature bird and only a few hours have gone by since it has been pulled out of the falconers net. As already pointed out earlier a hood is slipped on to its head. Also jesses and bells are secured to its feet. The jesses in turn are linked with the leash through a swivel coupling.

The hawk is left sitting on the ground and it will, quiet naturally try to bate about. In a very short time, however, it will quietly stay perched. If the hawk betrays extreme sensitivity and goes into a fit of gyrations, the falconer will atonce have to stop all such conduct and this may be achieved by blowing water over the back and head of the hawk. Once the hawk is quieted down, it will have to be left in this position for an hour or so before the falconer decides to pick her up on his gloved fist.

In his choice of hood the falconer may either use the rufter's hood or in the alternative an Indian type of hood. In my opinion the Indian hood will serve him better for in this case if properly clamped on, the hawk will find it impossible to slip it off. Also it has the added advantage of being designed so as to completely lend itself to the contour of the hawk's beak, making it possible for the hawk to throw up a cast even when hooded.

It is a wise practice to try and feed the hawk as soon as possible. Usually this attempt is successful if made some 4 or 5 hours after the hawk has been hooded. A little meat is rubbed against the hawk's beak, time and again, generally the hawk pecks at this offending object and in doing so has a taste of the food that is being offered. The piece of meat is then lowered and this time rubbed against the toes. Once again the hawk lowers its head and pecks at the meat. After several such attempts the hawk settles down to a regular feed and meat should be offered till the hawk refrains to take anymore.

The second night after capture two small holes are punched in the hood directly in front of the hawk's eyes. These holes should be of the order of $\frac{1}{8}$ of an inch in diameter. The idea of this perforation is to admit partial visibility so that the hawk is now able to see objects in front of it. Because of the small aperture involved, the angle of acceptance subtended at the hawk's eye will be very acute. The size of the hole in the hood is gradually dilated every night till it becomes large enough to permit about 30 percent visibility.

During this period the hawk requires most attention and in the very least 5 hours of handling during daylight hours superseded, by two or three hours of handling during the night is necessary. I have found it always very rewarding to get up early in the morning at about 6 A.M. and collecting the hawk on my fist to go out for a walk. There is nothing better than the cold frosty air on a winter's morning, to break in a hawk. By half past seven I am usually back home and an attempt to feed the hawk is made. When feeding, a whistle is blown from time to time so that the hawk after a few days of such treatment fully associates the noise of a whistle with food and thereafter whenever a whistle is blown it will expect to be fed. A piece of meat the size of a walnut is given to the hawk and it is then left on the screen perch to rest for at least two hours. By eleven O' clock the hawk is again collected and carried about—till lunch hour. In the evening again an hour of carriage followed by another meal should end the 3rd, 4th and 5th days of the Training. At night some handling of the hawk is always very rewarding but, this should be done in moderation and no undue pressure of keeping late hours be put on the bird. The hood is usually, completely removed on the 4th evening and thereafter hooding and unhooding carried out at regular intervals. The hawk is to be unhooded only when on the falconer's fist. When left to rest on the screen perch it should be hooded

and this time a regular hood without any peepholes and unlike the rufter's hood is to be used. The more a hawk is carried about in day light the sooner will it be trained. Soon the hawk begins to ignore the presence of human beings and will readily take food (i.e., meat) in the presence of even strangers, provided they remain quiet and still.

Once this stage has been reached the falconers will have to slightly alter his plan of feeding the hawk. The whistle is blown while the hawk remains hooded, naturally the hawk will expect to be fed and, show signs of uneasiness such as turning round and round on the perch and pecking at its jesses. At this juncture the hood is slipped off and a piece of meat is held by the falconer some ten or twelve inches away from it. The falconer repeatedly blows his whistle and if the hawk is not very keen to jump to his fist, offering the meat, he will move his hand an inch or so closer. The hawk will jump to the hand that is held forward to feed it and after it has partaken a little of the meat which is thus offered, it is restored to the perch and again the falconer beckons it. This time the gap between the hawk and the falconer's outstretched hand is slightly increased.

Usually a hawk is fed on mutton but it is always better to vary the diet by substituting some from of bird meat such as doves freshly killed or pigeon meat. In case a pigeon is on the menu, then only half the bird is permitted to be taken. Since the hawk at this stage will be comparatively tame it will be left unhooded on the screen perch every night and there will be no offending hood to obstruct it throwing out a caste in the early morning. A caste is a pellet of features undigested and thrown up each morning by all predatory birds that have in the course of their eating, the day before, swallowed some features with the meat. In a way a cast is very essential as it helps to keep the hawks' inside free from down and feathers which it is unable to digest, thus keeping birds of prey fit and healthy.

A cast is therefore to be given with each feed to the hawk and the next day only after the hawk has disgorged the feathery pellet should any attempt be made at feeding and training it to fly to the fist.

As already stated the distance between the hawk and falconer, at the time of calling her to his fist, is gradually increased each day till the hawk is made to fly for more than 30 feet. The use of a creanse is recommended in cases where the hawk when flying to the fist midway changes its mind and flies away in some other direction. Of course during all these exercises the leash is always secured to a light but strong line, one end of which is tied to the falconer's wrist. Once the hawk begins to fly from over a distance of 30 feet at the first call of the whistle and without any hesitation, to the falconer's fist, the use of

the line which has so far helped to anchor it, is no longer necessary. After a few dummy-runs from the screen perch to the falconer's fist the hawk is made to fly to some elevated perch such as the overhanging branch of some tree and called to the fist. The height of the perch is raised daily so that within six or seven days the hawk will be flying to the falconer's fist from the very top of the tree. Now the last phase in the hawk's Training comes into play. The falconer takes his stand with the unhooded hawk on his fist at a certain point. And here he will require an accomplice. A dead partridge is tied to some fishing line and one end of this line is held by the helper who conceals himself behind some bushes. At a given signal the helper draws the line thereby causing the dead partridge to be dragged across the field of view of the hawk. The hawk will at once fly for the moving object and attack it.

After two or three such exercises the hawk is ready to be flown at game. Selection of ground is very important, also the time of day and the prevailing weather conditions have got to be taken into account. Later when the hawk has had more experience and gained confidence in itself relaxations can be made here and there, but a hawk on its virgin flight should never be made to take any chances. Above all there should be no breeze of any magnitude.

After the hawk has ejected its cast in the morning it should be fed with a piece of meat washed in water and of about the size of an almond. It has got to be carried about for 2 or more hours and in the late afternoon at about 3 P.M., if there is no strong wind blowing, a slip should be attempted at game. It is always a very good policy to select some tree such as a big mango tree in the centre of an open field. It should be ascertained whether the tree harbours any owls. For it is usually in such trees that is found a colony of owls. The nearest cover should be in the very least some fifty yards away. Such trees are very commonly found in the country. The falconer must now explore the possibility of finding the direction in which the owls will fly when disturbed. This is simply achieved by pelting the tree with stones. In order to gain the next cover the owls will fly in a set line and, it is on this line of flight that the falconer stands ready with his unhooded hawk. The moment an owl is forced to break cover from the tree the hawk is slipped at it and all going well a kill immediately follows.

Exploitation of Forests in Parks and Sanctuaries

By

T. ANGAMI

There is a school of understanding among Wild Life Conservationists today which is opposed to the idea of exploiting the forests in our National Parks and Sanctuaries. There is another area of reasoning slowly evolving in the minds of another community of wild life Conservationists which is not opposed to the practice of exploiting the forests in Parks and Sanctuaries. The supporters of the former school of thought state that Parks and Sanctuaries should be exclusively set aside for a peaceful home of wild animals, while its opponents think that an occasional removal of old matured trees here and there does not constitute a breach of peace to the wild community. In fact the removal of overmatured, moribund and decayed trees is even necessary to maintain the forest hygiene. If I am allowed to consult myself, I find myself invisibly but definitely attracted towards the latter community of thought.

Popular notions and belief usually prove to be right, but the popular belief that wild animals are most abundant in thick virgin forests is wrong. Except for a specialized genus of birds and animals, wild virgin forests are a poor biological 'variety show', in fact a biological waste. Trees growing in these forests are tall and lofty and have their crowns high up in the air out of the reach of the common herbivorous animals. The crowns of these trees are also very thick and they smother the shrubbase and herbage, much to the disadvantage of animal-food economy.

As opposed to the above, forests with partially opened canopy have rich shrubs and herbs in the ground floor and hence animals are plentiful in these forests. Openings in the tree canopy encourages the growth of not only abundant herbage and shrubbase, but also the growth of a variety of grasses which appeal to animal appetite. An example which supports this fact is that in our own forests also animals are most abundant in Periodic Block I areas. The measured opening of the tree canopy in these areas induces the germination of not only the main tree species but also the growth of very many varieties of herbs, shrubs and grasses. Tender shoots of these plants are favourites of animals and hence animals congregate in these areas. This is the reason why natural gaps and openings in the forest should not be closed up hastily with artificial plantation. It has also been observed in forests of Assam and of Nagaland that herbivorous animals are more abundant near habitations than

in the very interior rain forests. A very interesting observation which may be mentioned in this context is that very often a hunter in the evergreen forests of Assam and of Nagaland will see sambhars following elephants. As mentioned earlier, in the untouched forests, the ground flora is poor and so the sambhars follow the elephants to browse the leaves of the trees which the elephants pull down.

There are many systems of forest Management, the one which finds popular usage in the management of forests around Tourist Centres and of Scenic beauties is called SELECTION SYSTEM. Under this system trees of only selected size are removed. A judicious selection of trees for removal, therefore, will not decrease the scenic beauty of the forest. Forest in the National Parks and Sanctuaries managed under this system will not lose its natural quality. It may be argued that some animals are too shy even for this extent of forest exploitation. If it is so, I may advise the forest denizens that the sooner they put off their modesty, the better it would be, because sooner or later Homo sapiens are sure to peep into their secluded sanctuary.

The American principle of multiple use of forest is happily gaining ground in the soils of India and I think it is a nice piece of humanism.

The Gir Lion

(*Panthera leo persica*)

(Local name:—Hindi—Sher Babar, Singha, Gujarati—Untia Bagh (camel tiger), Kathiawari—Sawach)

By

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I. Introduction

1. The lion is perhaps the most majestic animal among more than 500 different species of mammals with which Nature has so bounteously endowed the Indian sub-continent. In our country, it has been held in veneration since mythological times. It was the 'vahana' (mount) of the Goddess Durga who rode on a lion in her fight against the forces of darkness and barbarism. The Devi is, therefore, described as 'Mrigapathi skandhasthane' (one who

is seated on the back of the king of beasts). It is because of this association that the lion has become the symbol of 'Dharma' (righteousness). In the days of yore, kings when dispensing justice, sat on a throne which was called 'Sinhasana' (the seat of the lion) upon which rested justice and fair play. This is how the lion's head has come to adorn the Asoka Pillar which is the emblem of modern India.

II. Past and present distribution

2. The lion, like most of our Indian wild animals, is a migrant from another country. In prehistoric times, lions appear to have ranged over the whole of Central Europe, as indicated by the fossil remains discovered in England, France and Germany. Even in the more recent historic times, lions were found in Greece and perhaps also in the Balkans and the valley of the Danube. Herodotus narrates attacks by lions on the baggage camels of Xenophon in Macedonia. From its original home in Europe, the lion spread into N.W. Asia, and thence westwards into Africa, where it subsequently established its dominion practically throughout the continent, excluding the equatorial forests. During Biblical times, lions were abundant in Asia Minor and Palestine, from where their territory subsequently extended across Mesopotamia, Persia and Baluchistan into India. Entering India through the north-western passes, it soon spread over practically the whole of Northern and Central parts of the country, extending from Sind to Bengal and from the Ganges and Indus right up to the banks of the Narbada. The complete absence of the lion from the region south of the Narbada further indicates that India was not its original home, for in that case, it would have spread over the whole of the sub-continent and perhaps into Burma also. This limited distribution of the lion in India would further suggest that, unlike the tiger which is believed to have migrated into India from its original home in the icy wastes of Central and Northern Asia much earlier than the lion, the lion was comparatively a recent immigrant into India.

3. The early records of the lion in India make interesting reading. The Rev. Terry (1650) was frequently terrified by lions when passing through the vast jungles of Malwa. Lions were also abundant in this region during the Moghul period upto as late as the 1830's, and Emperor Jehangir is reported to have hunted them in the forests of Malwa. In 1822, they were to be found in considerable numbers in Saharanpur and N. Rohilkhand. In 1830, their occurrence was recorded in the Mt. Abu and Sabarmati regions. It was a favourite sport of British Officers to kill lions from horseback right upto 1832. Blanford has recorded the presence of lions in and around Gujarat during the last century as under:—Palanpur (1814), Ahmedabad (1830), Baroda (1832), Hariyana (1834), Ahmedabad

(1836), Guna (1860), Anadara (1872), Deesa (1878), Palanpur (1880), Abu (1881). Lions are also believed to have been found in the Barda Hills near Porbandar during the last century.

4. In comparison with the tiger, however, the lion was distinctly at a disadvantage in its struggle for domination and survival. The lion's comparative boldness and lack of cunning, as well as its herding instinct and its preference for an open habitat, made it an easy prey to the decimating influence of a rapidly increasing human population and the inexorable advance of civilization. With the passage of time, the lion was rapidly exterminated not only in Europe and over the greater part of S.W. Asia—only a few perhaps still survive in the remoter regions of Persia—but also in India, where its extermination was accelerated with the advent of the British. Many of the early British army officers and civil servants in India played havoc with wild life and there are numerous instances on record to prove that they commonly indulged in wanton wholesale slaughter of game just for the fun of it. Thus, for instance in Kathiawar, a British cavalry officer is reported to have shot as many as 80 lions during his brief stay of 3 years in that region; on one occasion, 14 lions were shot in the Gir forests within the short period of 10 days. Their numbers were further depleted by large scale poaching. Similar thoughtless butchery went on merrily in the rest of the country in respect of other game animals and birds such as the tiger, the rhino, the elephant, the wild fowl, the Imperial sandgrouse, etc. In the face of such merciless persecution, the remnants of the lion population in northern and central India were steadily driven westwards to the Gir forests of Saurashtra which now represent the last refuge of about 300 individuals of this much persecuted species which has been driven practically to the verge of extinction.

III. Habitat

5. Unlike the tiger which usually frequents dense forests with adequate cover, the lion prefers an open habitat of the savannah or scrub type bearing sparse tree growth. Its present habitat, viz., the Gir forests of Saurashtra (now in Gujarat State), is eminently suited to its requirements. It is a compact block of forest about 585 sq. miles in extent. The terrain is rugged and hilly with a maximum elevation of 1,741 ft. above mean sea level. The principal rivers are the Hiran and the Machhundari which usually have a perennial water supply, except during periods of severe drought.

6. The underlying rocks are of volcanic origin and are mostly made up of basalt or dolomite with a whitish or greenish tinge. Sandstone and limestone are also found in places. The soil is mostly black cotton but reddish soils and sandy loams also occur.

7. The maximum and minimum temperatures are 106°F. in May and 46°F. in January respectively. The average annual rainfall is about 25". The monsoon is irregular, commencing sometimes at the beginning of June and at others not till late July or early in August. The climate is fairly salubrious and healthy, except from August to December when malaria is common throughout the tract. The area is accessible by rail even during the rains, the railheads being at Sasan and Jamwala. The forest area is served by a network of fair weather roads. The best time for visiting the area is between January and March. The nearest aerodrome is at Keshod.

8. The Gir forests are of the dry mixed deciduous and thorny scrub types. On better soils, the predominant species is teak (*Tectona grandis*) which forms upto 70% of the crop, though the timber is poor in size and quality. It is associated with other species such as *sadad* (*Terminalia tomentosa*), *jamun* (*Syzygium cumini*), *timru* (*Diospyros melanoxylon*), *semal* (*Salmaal malabarica*), *karaya* (*Sterculia urens*), *behda* (*Terminalia belerica*), *khakhar* (*Butea monosperma*), *kudi* (*Wrightia tinctoria*), *aal* (*Morinda tinctoria*), etc., with bamboos (*Dendrocalamus strictus*) in patches. The thorny scrub consists of *Acacia* species, *ber* (*Zizyphus mauratiana*), *guggal* (*Commiphora mukul*), etc.

9. The tract is sparsely populated. Nomadic graziers maintain large herds of cattle. Their temporary camping places are locally called "Nes". Some of the principal 'Nes' in Gir forest are Kansia nes, Sandhbeda nes, Devalia nes, Kapuria nes, Gadakia nes, Dedakdi nes, etc. The 'nes' usually attract the lions who remain in the vicinity of the same in the hope of lifting stray animals to supplement their natural prey consisting of pigs, deer, bluebills, etc.

10. The changed conditions produced by the changing seasons also influence the movements of the Gir lions. During the hot weather, the Gir forest is bare and open, the water supply being localized to a few deep pools in the Hiran river and to some of the perennial nalas. Herds of game and cattle congregate at such pools during the parched summer months, followed by their predator, the lion. With the advent of the rains, however, the nature of the whole environment changes. The days of torrid heat are over. There is water everywhere and the parched countryside is now covered with an abundance of succulent vegetation, resulting in the wide dispersal of herbivorous animals. Following their prey, the lions also stray out of their forest limits into the neighbouring lands.

IV. General description—external characters and physical structure in relation to habits

11. The average length of the Indian lion is more or less the same as that of the African lion—a little over 9'. The largest recorded measurements are 9' 7" for an Indian

lion and 10' 7" for an African lion. A big lion weighs round about 450 lbs. Lionesses are smaller and lighter and lack the manes which so vividly characterise the older males. Cubs are also maneless, and sometimes even grown up lions have hardly any mane. On the average, the Indian lion has a comparatively scantier mane than the African lion. On the other hand, the Indian lion has a fuller coat, a longer tassel of hair at the end of its tail, a more pronounced tuft of hair on the elbow joints and a fuller fringe of hair on its belly. The mane is light or dark, rarely quite black, and may be fully developed or scraggy. The mane of a captive lion is usually longer and better developed since it does not suffer damage by getting entangled on thorny bushes, etc., as happens in the natural state. The lion is the only member of the cat family having a thick tuft of black hair at the end of the tail—both lions and lionesses have this. Lion cubs have brown spots or stripes on their tawny coats, but these gradually disappear with advancing age, though they may show faintly near the belly even in a full-grown lion.

12. Like the other members of the cat family, the physical structure of the lion is specially adapted to its carnivorous habits, there being a marked accent on the perfect development of those characters which mark the carnivore par excellence, viz., claws especially adapted to strike and hold struggling prey and teeth especially designed to bite into, cut up and tear its flesh, coupled with an unique combination of grace, agility, speed, brute strength and ferocity.

13. The jaws of the lion are very powerful and are provided with 3 different types of teeth. In the front portion of both the upper and lower jaws are small teeth (usually six in number) called the incisors which are useful in gnawing the bones and scraping away the tendinous attachments of the muscles. On both sides of the incisors in both the jaws, there are 4 large, strong and well-developed teeth which are known as the canines. When the jaws are closed, the canines interlock due to the peculiar mode of articulation of the lower jaw which moves on a small transverse hinge. The canines are developed into enormous separated fangs which, together with the incisors, enable the lion to bite and firmly seize its prey. The cutting up of the flesh morsels is done by the cheek teeth which have conical crowns raised up into pointed blades. There are 3 cheek teeth in the upper jaw and 2 in the lower. The sharp bladed cheek teeth work against one another like scissor blades and help to cut up and divide the flesh. The lion has 26 teeth in all.

14. Like the other members of the cat family, the lion's tongue is provided with numerous and prominent conical papillae encased in horny pointed sheaths which cover the tongue and stick into one's fingers like so many pins. The function of these numerous sharp

and rigid points is purely mechanical. They give the tongue the action of a rasp, this being an adaptation for licking the bones clean of flesh. This rasp-like tongue is also used for tidying the cubs, cleaning the claws and licking wounds. To most animals, the tongue is an organ of taste; but carnivorous animals like the lion, which tear to pieces and swallow their food in great chunks, can scarcely derive much enjoyment from its taste. The taste glands of a lion's tongue are set mostly along its margin.

15. The feet and claws of the lion are also well adapted to its mode of hunting, the essence of which is stealth of approach through noiseless stalking of its prey. The soles of the feet are padded and the claws (18 in number, 5 on each of the forefeet and 4 on each of the hind feet) are retractile, i.e., they can be exposed or withdrawn into their sheaths at will. When walking, the claws are withdrawn and the animal moves silently on its pads. The claws are unsheathed in the act of fighting or when attacking its victim. The claws are specially adapted for catching hold of the prey and tearing it to pieces. Each claw is curved and has a deep groove which helps to scoop out the flesh. Due to the presence of putrefying flesh and other decaying matter in these hollow grooves, the claw always harbour bacteria and other germs. As a result, any wounds inflicted on a human being mauled by any of the larger members of the cat family invariably cause blood poisoning. The foot print of the lion is known as a pug mark ('Sagad' or 'pagarun' in Gujarati). The pug mark of the hind foot is smaller than that of the forefoot due to greater weight coming on the front limbs. The pug mark of a male lion is comparatively bigger and the impression of the pad is almost round, while the pug mark of the lioness is smaller in size with the pad impression oblong in shape. The pug mark of an old animal shows wrinkles in the impression of the pad. The average pug mark of a full-grown lion measures about $8\frac{1}{4}$ " across while that of a mature lioness measures about an inch less. When walking normally, the lion generally leaves a double track, since the hind foot is not placed exactly over the print of the fore foot. When stalking its prey, it crouches closer to the ground and moves forward practically on its toes, the thickly cushioned pads muffling all sound. This digitigrade movement inclines the body forward and makes for greater agility and speed of movement culminating in the lightning charge which seals the fate of its unfortunate victim in a flash.

16. The lion, a nocturnal hunter, relies for its hunting mainly on its sense of hearing which is very strongly developed, and, to a lesser extent, on its vision and sense of smell. The large upstanding ears of the lion are capable of picking up the feeblest of air-borne sounds and its sense of direction in respect of the sounds reaching its ears is remarkably

accurate. The eyes are large and provided within with a well-developed system of muscles enabling it to contract the pupils to small circular openings in bright light and thus protecting the eyes from glare. In the dark, the pupils dilate to allow the maximum amount of light to enter the eye. The lion's eyes are thus well attuned to work in the dark and are quick to detect the movements of its nocturnal prey. The sense of smell which is poor in the case of the tiger and the panther, is comparatively better developed in the lion and is also believed to be used as an aid to hunting. The sense of smell is, however, highly developed in the herbivorous animals on which it preys and the lion always takes good care to bear in mind the direction of the wind when stalking its prey. The lion's long whiskers and tufts of bristles on its forearms are sensory tactile organs which, through connecting nerves, flash to the brain impressions gathered through feeling and touch. On the whole, the hunting of other animals for food requires a high degree of proficiency and beasts of prey such as the lion display a level of intelligence and a degree of brain development surpassed only by man and the higher apes.

17. The adult lion has a tawny colour but the cubs are either spotted or striped. This indicates its descent from spotted or striped ancestors. The uniform tawny colour of the lion harmonises with the surrounding colour tones of its savannah or scrub habitat and provides a fairly effective camouflage.

V. Habits

18. The Indian lion does not differ much in habits from its African counterpart. Of all the members of the cat family, lions are undoubtedly the most sociable creatures with a strong family life and, consequently, they are also the most noisy and vocal. This exceptional trait of character is perhaps attributable to their herding instinct which calls for a greater need for inter-communication. Lions usually live and hunt in family parties known as 'prides' comprised of about a dozen or even more individuals, large and small. One seldom fails to hear the roaring of lions on the prowl during the night in forests frequented by them, more noticeably at dusk and again just before day-break. They prey mainly on game and cattle, finding the latter much easier to kill than the natural prey such as pigs, deer, etc. The hunt is planned methodically and with intelligence, the males generally driving the quarry towards the position where the females are waiting in concealment to pounce upon the unsuspecting victims as they come within striking distance. They kill about once a week on the average. Unlike tigers and panthers, lions do not conceal their kills by covering them with leaves, etc.

19. Like cats, lions are affectionate creatures, particularly towards each other. If they have been separated for a while, they will rub faces together for a long time when they meet

again. There is strong mutual affection between the parents and their offspring. Lions may be seen threatening each other, but they rarely fight among themselves except when aroused by their mating instincts. The behaviour between different groups of lions is also both interesting and amusing. For instance, if some hungry lions on the prowl happen to come upon a group that is already feeding on a kill, they will look on enviously, obviously wanting to join in the feast but hesitating to do so as they are not very sure what kind of a reception they would get from the party at dinner. After some hesitation, they will gather a little courage and move in gradually and tentatively, a few inches at a time. If in this process, a member of the feeding group happens to look round, the intruders will stop in their tracks and stare up innocently at the sky as if to say: "Do you think it will rain to-day?" But as soon as they are unobserved, they will again edge forward a little farther. Usually, the feeding group is resentful at this intrusion at first; but after a while, after they have eaten enough, they slowly relent and ultimately allow the intruders peaceful access to the remnants of their meal.

20. It is very unusual for lions to climb trees. Being heavy and cumbersome, they are just not built for such gymnastics. African lions are, however, known to climb trees occasionally either to escape from the heat or to find a good vantage point from which to look for game in the surrounding countryside.

21. There appears to be no rigidly fixed breeding season in the case of lions. In the Gir forests, many lions mate between October and November and the young are produced round about January-February. The gestation period is about 116 days. The young are produced at intervals of about $1\frac{1}{2}$ to 2 years. The normal litter is of 2 cubs, but sometimes it may contain 3 or even upto 5 cubs. Unlike the male tiger which usually deserts its mate shortly before or after the cubs are born, the male lion remains with the family and, though it takes little interest in the offspring, it does help to defend them and to procure food for them. Like the tiger, the lion is believed to have a life span of upto 30 years. The male lion is in his prime at the age of 5 while the lioness is said to have her first litter when she is $2\frac{1}{2}$ to 3 years old.

22. Lion cubs are usually born blind and helpless, though some cubs can see at birth. The task of rearing up and training of the cubs devolves mainly on the mother. It is always she who keeps their nursery clean and attends to their toilet by licking them with her rasp-like tongue until they become capable of licking themselves or each other clean. When they stray from their lair, she brings them back, carrying them gently in her mouth by the scruff of the neck just as a house cat does. The young cubs are ever insistent in their demands for her attention by wailing and screaming. They cry not only when hungry but also when cold or when

left alone. For the first few days, she remains with them constantly, but later hunger compels her to go out and hunt. It is not known for how long she continues to nurse the cubs on milk; but, before they are weaned, the cubs begin to scrape off fragments of flesh from the prey she brings home. This is their introduction to meat eating. Training in hunting and stalking is also imparted to them right from the nursery stage. They learn to crouch and leap at each other. What seems pointless play with their mother's tail is in fact gaining of skill in the art of approach and attack. As they stalk its flicking tip, leap at it as it is whisked away, and seize and worry it, they are unconsciously practising the elements of their deadly craft. When strong enough, they are taken out by the mother or by both parents on family hunts during which the growing cubs gain valuable practice and experience in the art of stalking and killing their prey. When a family of lions is hunting, the hunt usually takes the form of an organised drive. Some of the members drive the quarry in the direction of others lying in wait to intercept and bring down the victim. It is said that in such family hunts, it is the lion who drives and the lioness which kills, while the cubs waiting by her side rush in to tear at and feed on the prey.

23. Animals that are fairly closely related are capable of being inter-bred to give offspring of mixed blood. Lions and tigers have been bred together. Their hybrid progeny which resembles both parents is known as 'liger' when the mother is a tigress and the father is a lion, and as 'tigon' when the mother is a lioness and the father a tiger.

VI. The population of Gir lions

24. As a result of their merciless persecution in the past, as referred to earlier, the population of lions in the Gir forests went on steadily decreasing till, in 1913, the situation became so alarming that, on a report from Mr. Wellinger, the then Forest Officer of the erstwhile Junagadh State, that there were hardly 10 lions left in an area of 700 sq. miles, the then State Administrator, Mr. Rendall, imposed a total ban on the shooting of lions. Thanks to this timely protection, the lion population made a gradual recovery and this magnificent species was saved from total extinction. A census of Gir lions in the Gir forest carried out in 1936 showed a total count of 234 lions. Further censuses carried out in this region in 1950, 1955 and 1963 put the lion populations at 200, 290 and 285 respectively. The sex-wise break-up of the latest census figure of 285 is 82 lions, 134 lionesses and 69 cubs. Given continued rigid protection, therefore, the Asiatic lion would appear to be in no serious danger of disappearing from the wild life map of India. Strict measures are, however, taken to curb the tendency of the local populace to poison lions taking a toll of their domestic cattle. In deserving cases, there is a provision for the payment of compensation upto Rs. 200/- to local cattle owners whose animals are lifted by lions, provided, of course, that there has been no slackness or

carelessness on the part of the cattle owner himself in looking after the animals preyed upon by lions. The complete protection of herbivorous game which constitutes the natural prey of the Gir lions is another measure which is indirectly instrumental in minimizing instances of cattle-lifting by lions and their retaliatory victimization by the vengeful cattle owners.

25. Censuses of lion population can be most conveniently carried out during the hot summer season when the movement of lions is necessarily restricted through the localization of water supply in their forest habitat. Consequently, at this time of the year, the area covered by the census operations is intensive rather than extensive, which not only facilitates the quicker completion of the work but also results in considerable economy by curtailing the manpower required for the work.

26. Counting of lion populations can be done either by the direct count method or by the indirect count method. In the former method which takes advantage of the lions' habit of congregating on kills, the animals are counted by direct observation after attracting them to an arranged 'kill' and counting them by driving them out in a beat thereafter. Lions get used to the presence of man comparatively easily and do not, as a rule, resent approach by car or close observation from a hide, either in day-light or at night. They also do not ordinarily leave an area in which they are regularly fed. While normally lions would cruise upto 40 miles during one night, they would not be inclined to do so if provided with a bait which would confine their movements to within a radius of a mile or two from the kill. In view of this, the drive and count method, though rather costly, would suggest itself as the most accurate method of assessing the lion population in an area. The tying up of baits should be left to the discretion of the local Ranger, the actual sites being selected in consultation with an experienced subordinate or shikari intimately acquainted with the terrain. On receipt of information of a pride of lions in a locality, adequate food supply should be provided to satiate the lions and so anchor them in the area. In fact, the lions should be anchored in the area as long as possible to prevent them entering other blocks or ranges where other lions are being similarly attracted to baits. A distinct advantage of this direct count method is that the individual characters of the animals can be observed and recorded, e.g., sex, size and colour of mane in the case of adult males, any other peculiarities, etc. Thus in this method of counting by sight, the sex ratio in the case of adult animals can be satisfactorily worked out. The number of baits required would be round about 60 for an area of 600 sq. miles. The baits should be tied up continuously for a reasonable period, though not for too long. If the lions are more or less evenly distributed over the whole area to be surveyed, census by drive and count method could be undertaken over 50% of the area and the figure so obtained doubled to give a fairly reli-

able estimate of the total lion population. Where feasible, this method of direct count may be supplemented by aerial observation for greater accuracy. Lion censuses based on the direct count method should be taken at regular intervals of 4 to 5 years.

27. In the indirect or track count method of census, the lion population is estimated by observing and recording all the fresh lion pug marks found on well-frequented roads or paths in a locality on an appointed day after obliterating all the old pug marks immediately prior to the day of census. The enumerators measure and record the length and width of the pug mark of the fore foot. For the reasons stated earlier, the hot season is the most suitable time of the year for this purpose. This method of census is based on 3 facts, viz., (i) The forefoot pug impressions of any two lions are rarely identical, (ii) Lions usually prefer to walk along roads and paths passing through the forest, (iii) Lions must drink at least once in 24 hours. This method of enumeration gives only a rough estimate of the lion population which may be wrong by as much as 100% if not executed properly. The results are, therefore, not as reliable as those obtained by the direct count method. Needless to say, it is absolutely essential to engage trained and experienced enumerators who are capable of observing and interpreting the pug marks correctly. All the censuses of Gir lions so far have been carried out by this method.

28. During the latest lion census carried out in March, 1963, an attempt was made to adopt a new method of throwing colour on the lions using a specially adapted 'Capchur' gun imported from the U.S.A. This gun was, however, found to have the following practical shortcomings and drawbacks:—

- (i) The noise made by the gun startles the lions.
- (ii) It has an effective range of about 75 ft. only and such a near approach to the lions could sometimes prove dangerous if proper precautions are not taken.
- (iii) There are only 2 colour syringes, the remaining syringes being for sedatives meant for tranquilizing the animal for purposes of capture. Much time is, therefore, wasted in recovering these syringes for reuse. It would be preferable to use coloured pellets instead, which will not be required to be recovered.

VII. Finding an alternative home for the Gir lion

29. With a view to finding an alternative home in India for the Gir lion, three captured specimens (one male and 2 females) were released in the Chakia forest near Varanasi in U.P. within the precincts of the Chandraprabha Game Sanctuary in the year 1957. However, this attempt did not prove as fruitful as was expected. Attempts made by the late Maharaja Scindia

of Gwalior to introduce African lions in his forests also proved unsuccessful. An important point which must be borne in mind in this connection is not to introduce lions in a forest area where they are likely to be exposed to encounters with tigers, since these two kings of the jungle will never co-exist within the same territory. A few lions released in a forest already frequented by tigers would stand a very poor chance in their inevitable struggle for survival and supremacy against their far more wary and cunning rivals. Incidentally, there are no tigers in the African continent which comparatively abounds in lions.

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A Novel Method for the Capture of the Indian Flying Fox (*Pteropus G. Giganteus* Brunnich) for Meat, Fur and Control

By

H. KHAJURIA

The Indian flying fox is very common in India and some adjoining countries. It is of great economic importance, being a highly destructive and cunning pest of garden fruit. It can also be a very cheap source of good meat and fur. Unfortunately there appears to be no good method on record which can economically be used for its collection (*J. Bombay nat. Hist. Soc.*, vol. 50, pp. 401-402; vol. 51, p. 268). The various suggestions made in the above notes, *i.e.* burning of sulphur below the roost, pesticides, detonators, shooting, etc., for its control are obviously beset with some serious practical difficulties. In view of the fact that the animal, contrary to insectivorous bats, cannot avoid collusion with wires, etc., in flight, the writer had in mind for sometime past some sort of large net which may be recommended for its capture; but the practical demonstration of the method could not be arranged. Recently while on a survey tour, it was a pleasant surprise to find such a method actually in use at Kareli, a small town in Narsinghpur District, Madhya Pradesh (Plate 1), for the capture of the animal for

meat. It consists of an extensive net about 30 mts. long and $1\frac{1}{2}$ mts. wide with meshes about 12 cm. sq. sliding on a long cotton rope. Small weights, pebbles, etc., are tied to the lower border of the net at intervals to keep the net stretched. The whole net consists of thick cotton twine. The two ends of the cotton rope from which the net is hung are passed over forks tied to long poles and are held by two persons. The poles are tied to the branches of the trees or other supports which are generally available near the roots to keep the net at the level of the flight of the bat. If no such support is available the poles have to be sufficiently long to keep the net at the proper height. In the latter case they can permanently be fixed in the ground so as to be available when required. The variations in the levels of flight of different individuals appears to be restricted so as not to necessitate a very wide net. The net should ordinarily be used when the animal leaves the roost at dusk or return to it at dawn. They can be disturbed during day to enter the net but continuous disturbance may result in abandonment of the roost. A number of nets can be used to cover all directions of flight.

As soon as one or two individuals have entered the net, the latter is lowered by loosening the sliding ends of the rope by the two persons so as to facilitate the removal of the specimens immediately. If they are allowed to remain in the net for a long time, the latter may be damaged by their teeth and violent movements. The net is immediately put in position again for further use by pulling down the two ends of the rope. In this way the device can be used a number of times at dusk and dawn during the flight of the animal which may sometimes be spread over an hour or so. The captured animals should not only be destroyed but also be utilized for supply of meat, which is excellent, and fur for manufacture of fancy articles for export (*J. Bombay nat. Hist. Soc.*, vol. 55, p. 155). It may take time to exterminate the colony depending upon its size but a cheap slow method is to be preferred to any expensive rash method which may result in large scale destruction and forcing several individuals to leave the roost, because the former method ensures a continuous supply of cheap meat and fur and eliminates the possibility of the total destruction of the species. This method of collection also avoids all kinds of damage to the skin.

The meat is reported to be taken by Dhimar, Pansi and some other tribes in some parts of Madhya Pradesh and is relished as a delicacy and cure for rheumatic pain and even in snake bite. The oil obtained is also used for similar purpose. The flesh is also reported to be taken in other parts of India, and its use must be popularized to augment the food supply of at least poorer sections of the population. If this is achieved, it will automatically result in control of the pest.

The old man (Dhimar tribe) shown in the photograph (Plate 1) along with the net was jeered at by some people when he disclosed that he along with his family has



A novel method for the capture of the Indian flying fox (*Pteropios g. giganteus* Brünnier) for meat, fur and control.

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regularly been taking the meat and that he has learnt the habit from the Pansi tribe at Jabalpur. He, however, defended himself admirably by arguing that the flying fox feeds on the juices of various fruits and is, thus, one of the cleanest feeder among the animals and that its meat should be preferred to that of such dirty feeders as pigs and fowls which is much prized by several communities despite its exorbitant price. Had there been more such sensible persons in the country as regards their food habits, her agricultural economy would have been much sounder!

The method may also profitably be used in the case of other forms of the flying foxes with similar habits.

A Note on the Wild Life of Uttar Pradesh

By

ARJAN SINGH

These are the days of Planning. The daily papers are full of Planned Economy, Five Year Plans and Family Planning. The Forest Department also has its 'working plan'. Yet, in the midst of all this order, Wild Life continues to be sponsored in a whimsical, haphazard, hit-or-miss fashion. The cause of this stems from the fact that it is a very subsidiary, and largely non-revenue-earning, part of the Forest Department, yet it retains the glamour of Shikar handed down as a bonus privilege from pre-war days. It is, therefore, treated as a vested interest by the Department, resenting any interference and resisting offers of co-operation as an encroachment which they claim will let in undesirable elements.

All this, however, must be viewed against a changing background where emphasis has shifted and conditions have altered. In the old days the Forest Officer made a hobby of shikar, jealously guarding his privileges and, later, often forsaking the gun for the camera, as do many who live in close proximity to the wild things of nature. He picked up expert knowledge, wild life was plentiful, and the rules were sufficient to ensure that the wild life harvest was tempered by conservation. The Forest Officer of today is mainly not interested in wild life and spends as little of his time in the forests as possible. The service once much sought after is now a dump for the 'also rans'. The Department yields massive revenues

and all efforts are to an increase in income and an acceleration in the cycle of returns. In all this "money spinning" wild life obviously does not have a place, except for the shikar companies which can earn a few blood-stained dollars by inviting the trigger-happy millionaires of the world to slaughter our already depleted wild life. On the three operating in Uttar Pradesh, not one is scrupulous in the observance of shooting rules and it is a safe bet that the three under recommendation will maintain the same standard.

It is, therefore, essential that Wild Life Preservation must be approached in a scientific manner if we are at all serious in our avowals. To start with, a census must be conducted for all animals in the State and it will only then be possible to state the number of a particular species which may be shot. A census was conducted in Dehra Dun two or three years ago, but the figures were obviously inaccurate. For example, the number of wild cats was listed as two and as the 'Cheetal' succinctly remarked 'if the pair were of the same sex the race was doomed!' Elephants were reported to be over-plentiful and processes of control were discussed. Shooting licences were issued ad lib and numbers were wounded. The Wild Life Department now says there are only about two hundred and fifty in the State. This information is seriously misleading and can lead to serious complacencies in the case of rare species. A virulent campaign of hate is sought to be built up through the Information Department against the 'nilgai' and this fine antelope—the second largest in the world—which is fighting a losing battle, together with the black buck and 'chinkara', against the advance of cultivation, has a blanket reward on its destruction, though one may go many miles before one is seen in the reserved forests where once it was protected. They are supposed to be destructive to plantations, yet mushroom-cattle-stations spring up yearly, burning the grass in these plantations in search of green fodder, destroying and trampling the tender plants and causing incomputable damage to the Department. Moreover the tiger who dares to kill a few of these useless scrub cattle, who have invaded his age long home, deprived his natural prey of their fodder, and spread disease to the dwindling deer population, is sought to be branded a cattle-lifter. The otter, a delightful pet when domesticated, is not numerous enough to cause any appreciable damage, has a price on its head, whereas the professional fisherman denude the jungle streams of all the fish, large or small. The leopard cat, so seldom seen, in addition to its beautiful coat, has a reward for the lucky killer. Ad infinitum. In all countries where wild life management is pursued scientifically, the system of bounties on the destruction of species has been abolished, and the funds devoted to development. The balance of nature is upset by man.

I will once again strongly suggest that the co-operation of other countries in scientific wild life management be sought.

The meeting of the State Wild Life Board at Dhikala has amply demonstrated that its recommendations are purely advisory, and not very welcome advice at that. All worthwhile resolutions were either summarily dismissed or not even accorded the courtesy of consideration. Rules for the governance of wild life outside forest areas, promised at the first Board meeting in July 1964, are still in embryo, while wild life in non-forest areas zone is slaughtered and marketed in season and out. Even the wild life inside the reserved forest is doomed unless positive measures are taken in hand immediately. Restrictive laws which cannot be enforced are sometimes worse than no laws at all. At present sanctuaries are declared and the matter ends. No supervisory staff exists and in the absence of legitimate permit holders, poaching is intensified. These sanctuaries should be developed as tourist attractions as it is only when wild life can earn foreign exchange that the present step-motherly treatment will cease. Felling operations in sanctuaries should be co-ordinated by the Wild Life Department, and the funds utilised for development. A regular staff should operate these sanctuaries and their lease should even be considered to selected private individuals in co-ordination with the Department, for the development of tourism.

* * * *

[We have already pointed out the inaccuracy of the Dehra Dun census, as well as the inequity of 'bounties' on some animals, but we do not necessarily agree with all other points raised by Mr. ARJAN SINGH.....Ed.]

Detailed notes on use of Tranquilizers and Anaesthetics with the help of Flying Syringe against Wild and Feral Animals

By

K.L. MEHTA

Chief Wild Life Warden, H.P.

Man has long sought to deliver various fatal, immobilizing or paralytic drugs from a distance into the circulatory system of animals. Strophanthus (Kombe arrow poison) and curare (South American arrow poison) have been the compounds of choice for this purpose. The major objective of the procedure has been to kill the subject by propulsive drug induction. Certain primitive tribes of Africa and South America have perfected the technique to a point which excited the imagination of many investigators.

Within the past decade research workers of the United States and England have explained the potentialities of various strychnos extracts for immobilizing wild animals for live capture. Extensive experimental work directed towards this end was commenced in early 1955, by the Georgia Game and Fish Commission, and University of Georgia, U.S.A., and the curare alkaloids and Synthetic curare like compounds appeared to be in order for continued study. But during the 1st phase of the project, only one wild deer was successfully taken with flaxedil (Lederle Laboratory Division, American Cyanamid Co., Pearl River, New York), and this group of compounds was found to have many undesirable characteristics, further work with similar-acting drugs was discontinued.

After further study with other alkaloids from this plant group (Strychnos Sp. and Chondrodendron Sp.) a fair degree of success was reported from the use of certain strychnine salts for the capture of white-tailed deer (*Odocoileus virginianus*). Mortality was still in excess of 50% with losses from this approach exceeding that necessary for practical applications. The use of salts from *Strychnos nuxvomica* was discontinued and an extensive screening programme for other drugs possessing the necessary qualities was thereafter conducted.

It was concluded that the ideal drug for these purposes must possess the following nine characteristics. These are in brief: (a) an effective dose must be carried on a small dart, (b) stability, (c) rapid absorption, (d) fast onset of action, (e) wide safety margin, (f) no

antidote required, (g) rapid elimination, (h) no gross effect on gestation, (i) and no permanent damage to the recipient.

After screening more than 100 compounds by subcutaneous and intra-muscular injections into goats, nicotine salicylate which appeared to possess the above characteristics was selected for extensive trials.

Nicotine action or Pharmacology and Toxicology of Nicotine with special reference to species variation

Tobacco (*Nicotiana tabacum*) and its active constituent, nicotine, have had little if any rational therapeutic application other than psychotherapy and as a pesticide. The pharmacodynamics of nicotine have been the subject of intensive investigation since Langley and Dickinson (1889) demonstrated that topical application could produce ganglionic paralysis.

The term *nicotine action* of autonomic active drugs refers to an evanescent stimulation followed by ganglionic paralysis, this typical biphasic action is present at all autonomic ganglia, myoneural junctions and affects the central nervous system, varying in duration and intensity as a function of dose, mode of administration and species of animal. Toxic effect of nicotine on invertebrate organism is determined by the degree of development of the nervous system but that vertebrate animals which have enough in common to stand near each other in the phylogenetic order may react differently to nicotine. Scientists compared toxicity of synthetic D-nicotine with natural-L. nicotine and have postulated that variance of toxicity between the two isomers is a function of development of specially specific receptors at the neuroeffector synapse of voluntary muscles, that it is proportionate to the development of the acetylcholine system.

The ability of nicotine to induce experimental Catatonia, similar to cataleptoid action of bulbocapnine, was observed in dogs injected with relatively small doses of nicotine tartrate.

Repeated administration of small or sublethal quantities of the alkaloid, or its salts, results in a rapidly diminishing pharmacological response. It has further been confirmed that isolobinine and nicotine produce mutual tachyphylaxis in rats and that one-tenth of the effective dose for either of these alkaloids will confer protection against convulsive doses, however, tachyphylaxis is less pronounced in cats and rabbits. Species variation inability to eliminate nicotine and unsusceptibility to toxic effects was reported by Larson, (Game and Fish Commission Georgia). The medium lethal dose by intravenous injection, was established for cats as 2.0 mg/kg, for dogs, as 5.0 mg/kg for mice, as 7.1 mg/kg; and for rabbits, as 9.4 mg/kg. However, when nicotine was perfused slowly, intravenously, over an 8 hour period, dogs could tolerate 2.0 times the lethal dose, rabbits 3.3 times, mice 4.6 times, and

cats 10.0 times the lethal dose, this indicates that the ability to metabolize or excrete nicotine is independent of species susceptibility.

Aqueous solutions of chemically pure, natural nicotine, unbuffered, of PH 8.4, or the equivalent amount of nicotine salt, were administered by intramuscular routes, to all experimental animals. To avoid development of tachyphylaxis, animals were used only once, or were allowed an interval of not less than 48 hours for eliminating all traces of the drug. The end point for determining paralysis of animals was loss of locomotor function.

The minimum paralytic dose of nicotine and the approximate lethal dose for 14 species as tested by the Wild Life and Fish Commission, Georgia, U.S.A. is given in table below:

Table 1

Paralytic and approximate lethal doses of nicotine, administered by intramuscular injection

Animal	No. of Observations	Minimal effective dose (mg/kg)	Approximate lethal dose (mg/kg)	Therapeutic index
Pigeons	20	5.0	9.0	1.8
Mice	100	5.0	8.0	1.6
Rats	50	10.0	15.0	1.5
Rabbits	30	18.0	30.0	1.6
Guinea Pigs	15	8.0	15.0	1.8
Chinchillas	18	10.0	18.0	1.8
Dogs	24	4.5	15.0	3.3
Cats	10	3.5	9.0	2.5
Cattle	38	4.5	9.0	2.0
Horses	6	4.0	8.8	2.2
Swine	4	6.6	14.0	Not determined
Goats	200	3.6	13.0	4.3
Deer	205	3.0	9.0	3.0
Monkeys	8	4.0	6.0	1.5
Zebu (Bos indicus)	1	3.3	—	—
Bison	5	3.5	—	—
Kodiak Bear	4	3.0	—	—
European Brown Bear	4	3.0	—	—
Lion	2	2.5	—	—
Tiger	2	2.5	—	—
Tapir	1	3.0	—	—

The paralytic dose was also tried on the following animals by me:

Strength of nicotine salicylate 200 mg.

Name	Adm. mg.	Paralytic dose
1. Panther		2.5
2. Bear		2.5 to 3
3. Barking Deer		1.5 to 2.0
4. Ghoral		2.0
5. Rabbits		16 to 18 mg.
6. Monkeys		2.0 mg.
7. Goats		1.0 to 3.0 mg.

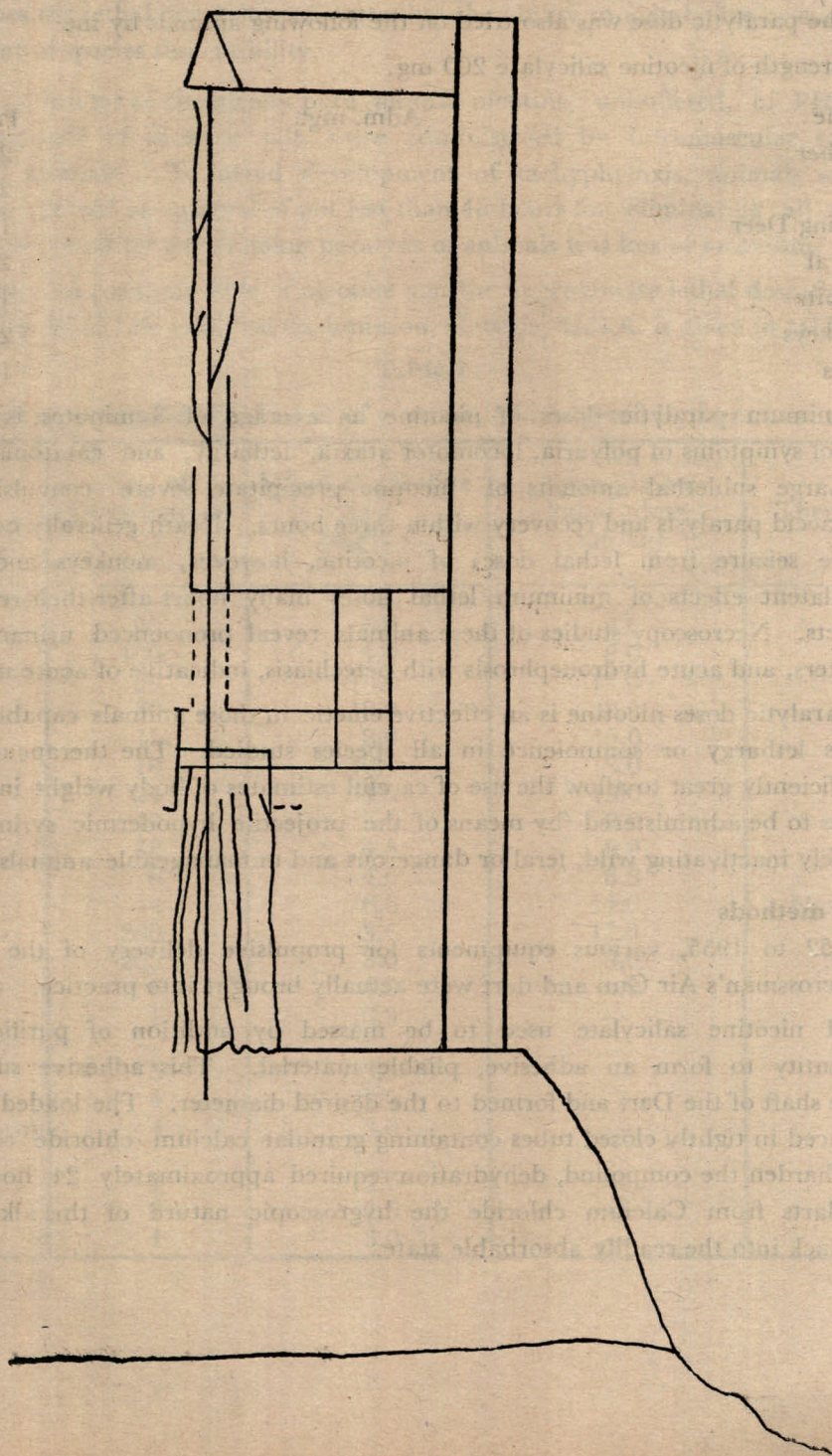
After minimum paralytic doses of nicotine an average of 3 minutes is required for development of symptoms of polyuria, locomotor ataxia, lethargy, and catatonia or flaccid paralysis. Large sublethal amounts of nicotine precipitate severe convulsive seizures, followed by flaccid paralysis and recovery within three hours. Death generally occurs during the convulsive seizure from lethal doses of nicotine, however, monkeys and cattle may succumb to latent effects of minimum lethal doses many hours after their recovery from paralytic effects. Necroscopy studies of these animals reveal pronounced urinary retention, distended ureters, and acute hydronephrosis with petechiasis, indicative of acute uremia.

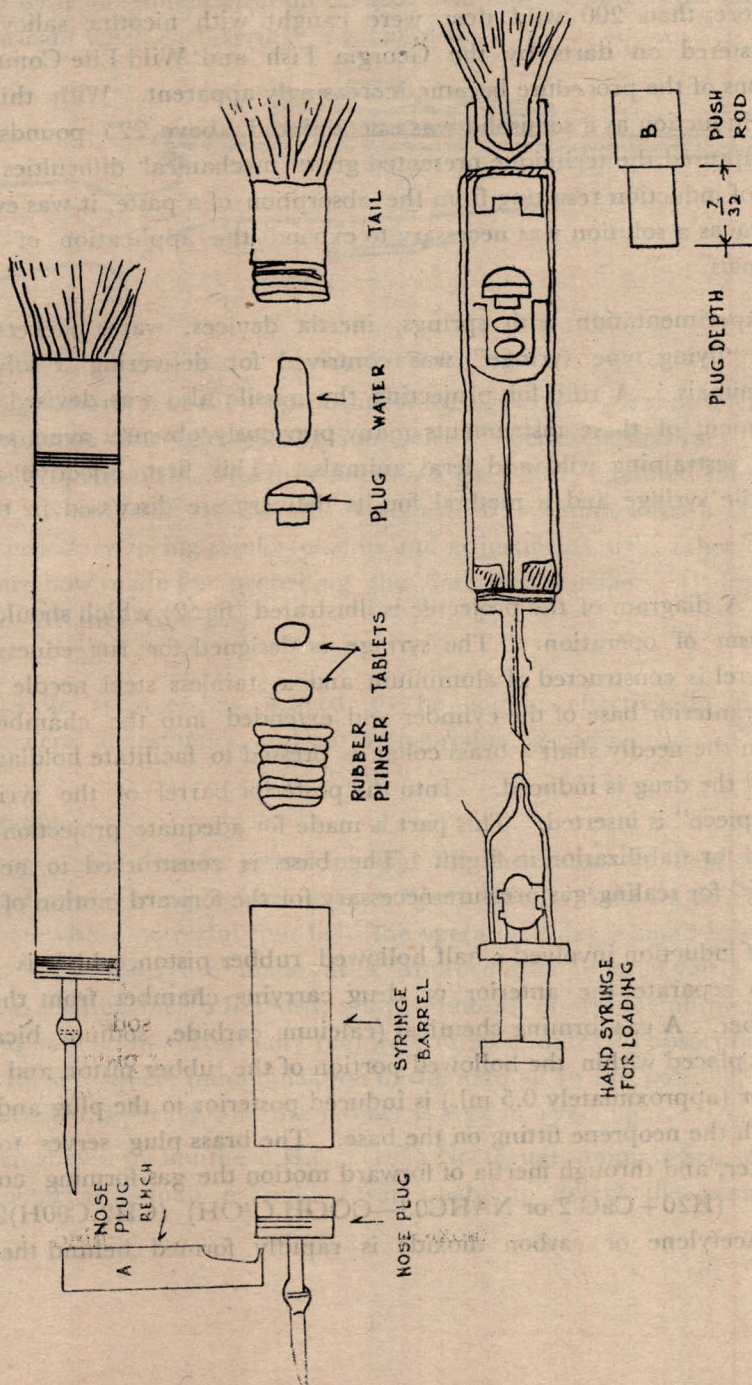
In sub-paralytic doses nicotine is an effective emetic in those animals capable of emesis and promotes lethargy or somnolence in all species studied. The therapeutic index for nicotine is sufficiently great to allow the use of careful estimates of body weight in calculating paralytic doses to be administered (by means of the projectile hypodermic syringe) for the purpose of safely inactivating wild, feral or dangerous and unmanageable animals.

Material and methods

Since 1952 to 1955, various equipments for propulsive delivery of the Drug were invented and crossman's Air Gun and dart were actually brought into practice. (See figure).

Powdered nicotine salicylate used to be massed by addition of purified honey in sufficient quantity to form an adhesive, pliable material. This adhesive substance was applied to the shaft of the Dart and formed to the desired diameter. The loaded darts were used to be placed in tightly closed tubes containing granular calcium chloride to dehydrate and partially harden the compound, dehydration required approximately 24 hours. Upon removal of darts from Calcium chloride the hygroscopic nature of the alkaloidal salt converted it back into the readily absorbable state.





Although more than 200 wild deer were caught with nicotine salicylate (200 mgm strength) administered on darts by the Georgia Fish and Wild Life Commission yet the limited applications of the procedure became increasingly apparent. With this method the necessity of drug induction as a semisolid was essential and, above 225 pounds body weight of subject to be captured the technique presented great mechanical difficulties. Considering the slow speed of induction resulting from the absorption of a paste, it was evident that the delivery of nicotine as a solution was necessary to expand the application of the technique use in larger animals.

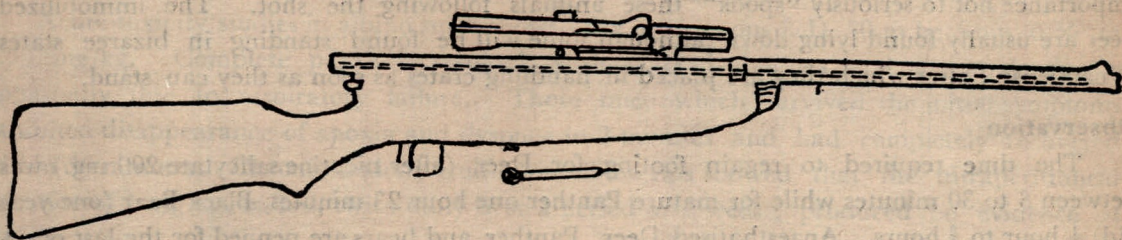
Following experimentation with springs, inertia devices, water jackets, combustion chambers, etc., a "flying type syringe" was contrived for delivering a solution into the musculature of animals. A rifle for projecting the missile also was devised. Concurrent with the development of these instruments many previously obscure avenues were opened for capturing and restraining wild and feral animals. This first effective and practical automatic projectile syringe and a method for its delivery are discussed in this report.

Instruments

SYRINGE. A diagram of the projectile is illustrated (fig. 2) which should aid in describing the mechanism of operation. The syringe is designed for ruggedness and positive action. The barrel is constructed of aluminium and a stainless steel needle (13-16 gauge) is pressed into the anterior base of the cylinder and extended into the chamber. Approximately midway on the needly shaft a brass collar is pressed to facilitate holding in the flesh of the animal until the drug is induced. Into the posterior barrel of the syringe a screw-type base or "tail piece" is inserted. This part is made for adequate projection with a nylon fibre skirt attached for stabilization in flight. The base is constructed to accommodate a neoprene "O-Ring" for sealing gas pressure necessary for the forward motion of the plunger.

Mechanism of induction involved a half hollowed, rubber piston, which is inserted at a given distance to separate the anterior or drug carrying chamber from the posterior or combustion chamber. A gas-forming chemical (calcium carbide, sodium bicarbonate with citric acid, etc.) is placed within the hollowed portion of the rubber piston and sealed with a brass plug. Water (approximately 0.5 ml.) is induced posterior to the plug and the compartment is sealed with the neoprene fitting on the base. The brass plug serves to separate the chemical from water, and through inertia of forward motion the gas-forming components are brought together ($H_2O + CaC_2$ or $NaHCO_3 - COOH.C(OH)(CH_2.CO_2H)_2$ gas under compression). Acetylene or carbon dioxide is rapidly formed behind the plunger, and

forward motion with subsequent ejection ensued. All moving parts and threads are treated with silicon lubricant when each syringe is assembled.



Capchur Rifle

RIFLE: A photograph of the instrument for syringe delivery is shown (photograph). This mechanical appliance was selected for simplicity of operation, accuracy, performance, and reliability in field operations. The instrument is a gas (CO_2) operated rifle (Crossman Arm Co., Rochester, New York) which was designed to accommodate a 50 caliber projectile syringe. The necessary spring reinforcements and adjustments with other breech and bore modifications are now made for propelling the described missile. (Palmer Chemical and Equipment Co., Atlanta, Georgia).

Results

The projectile syringe has proved to be highly effective in delivering various tranquilizers, general anaesthetics, and paralysis-producing compounds into the Musculature of animals.

Hunting Methods

The hunting of wild deer for restocking wild life sanctuaries or depleted areas of wild life, is confirmed mostly to night work using a "Jack light". When a deer is located from a vehicle equipped with a powerful spot light the operator, using a small head light made the stalk on foot. The shots are made at a distance from 10 to 30 yards, with the large hip muscles (gluteus medius, biceps femoris, semitendinosus, or semimembranosus muscles) being the site for drug induction. It usually require 4 to 30 minutes for absorption and circulation of the drug, with subsequent immobilization of the animals so far possible, visual contact is maintained during this period, and the subject is kept in a red light.

It has been shown by Southern H.N. (1955 Nocturnal animals-Sci. Amen., 193:88-98) that several nocturnal animals in England were unable to detect the presence of red light

and this physiological characteristic seemed to apply to deer. Contrary to most preconceived opinions, the implantation of the syringe does not frighten the Deer and it is of utmost importance not to seriously "spook" these animals following the shot. The immobilized deer are usually found lying down (although some will be found standing in bizarre states of catalepsy), after which they are placed in handling crates as soon as they can stand.

Observation

The time required to regain footing for Deer (after nicotine salicylate 200 mg.) was between 3 to 30 minutes while for mature Panther one hour 23 minutes, Black Bear (one year old) $\frac{1}{2}$ hour to $\frac{3}{4}$ hours. Anaesthetised Deer, Panther and bears are penned for the last one $\frac{1}{2}$ year and no adverse effects have been observed. One doe of Barking Deer anaesthetised during the late gestation period raised normal fawn.

Himalayan white goats immobilized twice during gestation gave birth to normal kids and no effect on the reproductive potential was observed among those goats.

To neutralize the effect of Nicotine salicylate. "Diquel" and "Sparings" 50 Mg per C.C. were used. The result were very favourable.

From the above report, when it took a Panther $\frac{1}{2}$ an hour to paralyse, I wrote to one Doctor Robert Thomson, in U.S.A. (a friend of mine) about this timing and evident danger from this animal during the duration from the actual shot to paralytic condition of the animal. He has very kindly sent another medicine namely "Anectine" (Succinyl Chloride) also referred to as diacetylcholine chloride 20 mg. in each cc. for trial.

Pharmacological Action

Anectine causes muscular paralysis by producing a blockage of nervous transmission at the myoneuronal junction. It has further been found that doses as low as 0.05 mg/kg given intravenously to cats are effective in producing muscular relaxation, and that intravenous doses of 0.1 mg/kg or more produce prompt and complete muscular paralysis which is characterized by short duration of action and extremely rapid recovery. Repeated injections produce reproducible and predictable muscular paralysis, neither tachyphylaxis nor significant cumulative effects being seen. When given by intravenous drip, a predetermined degree of relaxation in a cat (Sciatic nervegastrocnemius muscle), could be closely approximate by adjusting the rate of flow of the solution. The administration of doses of "ANECTINE" sufficient to produce complete neuromuscular blockage has not caused any significant change in blood pressure (except for the typical asphyxial pressure response in the absence of adequate respiration). No evidence of any histamine-like depressor action has been found,

thus differing from observations with ditvbocurarine. The ECG of the cat was unchanged during a 2-hour infusion maintaining complete paralysis.

Acute toxicity studies in albino mice showed the intravenous L.D. 50 to be from 0.55 to 0.59 mg/kg. Complete paralysis resulted, with marked dyspnea and anoxia; death was apparently due to respiratory failure. Those mice which survived the initial symptoms exhibited disappearance of anoxia and dyspnea in 2 minutes and had completely recovered within 30 minutes. Chronic toxicity studies on albino rats showed that the intraperitoneal injection of 1 mg/kg, or less, twice daily over a period of 4 weeks, produced no evidence of toxicity.

Precautions for the use of the drug

The drug should be used only by those skilled in the administration of supplemental or controlled respiration and facilities for this procedure, including adequate respiratory exchange with oxygen, should always be immediately available. "ANECTINE" is not an anaesthetic agent and should not be regarded as substitute for anaesthesia; its use does not take the place of giving an adequate amount of anaesthetic agent.

Some anaesthesiologists believe that rapid injection is responsible for the muscular twitching that is seen just prior to relaxation. These fasciculations may be due to the rate of injection of the drug, and may be minimized or avoided by giving the injection, more slowly.

While respiratory depression is usually of very short duration following a single dose of the drug, or following cessation of continuous intravenous administration, there may be an occasion, especially with excessive doses, more prolonged respiratory depression, requiring controlled respiration and the administration of oxygen.

The duration of the effect of "ANECTINE" may depend on plasma-cholinesterase activity. Patients with severe liver disease, severe anaemia, severe malnutrition, and possibly those suffering from polyphosphate insecticide poisoning may have a decreased plasma-cholinesterase activity which may intensify and prolong the action of "ANECTINE" especially if large doses are used. In such cases, in addition to the usual measures of controlled respiration and administration of oxygen, it may be desirable to administer plasma or whole blood for the purpose of restoring cholinesterase activity.

Anectine has been tried by me on Panther (Two years old), Bear (about 2 years old) Rabbits and Monkeys, etc. Approximately I.C.C. per 100 lbs. body weight and proportionately more or less according to weight has been tried successfully. The medicine is quickly

absorbable and more effective and much less dangerous to the animal. The drug wears off in about 25 minutes, so that a full dose can be given again. Beasts need about 25 mg. per 100 lbs. The animal usually recovers between 5 to 15 minutes

A matured panther can be paralysed within 3 to 5 minutes with the medicine, as such there is hardly any danger to anaesthetise the dangerous animals and the medicine can serve our purpose well in capturing or transporting wild animals.

Recommendations

1. *Much experience* is required to use the "capchur-gun" and flying syringe and *especially the medicines*. 1/10th mgr; in excess of the prescribed dose may result into fatality of an animal.
2. The gun can be used only for animals, feral and wild and not for capturing Birds.
3. The gun can play most important part in capturing deer, etc., for transportation to depleted areas, under the conservation programme.
4. The gun is equally useful for transportation of animals within and outside the zoo, as animals become wounded during transshipment, when they are excited by the change.
5. After the animal is immobilized and shifted in the transport cages, it is further kept submissive by use of tranquilizers with the aid of this gun.
6. Various drugs which can be injected can be used on animal with this gun. An example of its usefulness is in treating shipping fever among animals.
7. For animal Husbandry Department the gun is indispensable.
8. The gun can be used in capturing and tagging Bears, Panthers, Deers, etc., to study their life Histories in the natural habitats and their migratory ranges.
9. The gun cannot be used for taking census of Deer as it is too expensive to use. If at all it is to be used, more guns are brought into action by the numerators.
10. The gun should be purchased only when there is special educated staff meant for the purpose of capturing animals under "transportation of species in depleted area" programme.
11. The medicines used in the flying syringes are highly dangerous to be used against human beings. A painful death may occur due to paralytic condition of the lungs and nervous system. Therefore, full account of the quantity of the drugs will have to be maintained by the Officer-Incharge.

Research on Development of National Park, Shivpuri

By

DIWAN SURINDER LAL

Shivpuri, M.P.

Shivpuri was the Summer Capital of Gwalior State and during the time of the Scindia Rule it was a very attractive and popular holiday resort. The State had provided a very comfortable Hotel and many other amenities which attracted visitors. Unfortunately during the last few years Shivpuri has been neglected rather badly and I would like to draw the attention of the Government to this and give below a few suggestions that will go a long way to make Shivpuri once again a very attractive draw for Foreign Tourists as well as other visitors.

1. Provision of a First Class Hotel with good food; Arrangements

This is of utmost importance as without comfortable living arrangements and good food it is difficult to draw Foreign Tourists or visitors. The present hotel is quite unsuitable from the point of view of situation, accomodation, Food arrangements, quality of linen and service. The best thing would be to acquire the Sakhya Sagar Sailing Club Building and George Castle in the National Park and convert these into luxury Hotels. This can be done with very little cost and if these are properly staffed and good food provided these with their lovely situation would draw a lot of visitors. Both these places can also be made to run as Cafe or Restaurants where visitors can get food, clean eats and drinks. As Shivpuri is situated at a distance of only 270 miles from Delhi on the Agra-Bombay National Highway and is also on the cross roads of the Calcutta-Bombay Road there is a lot of road traffic and this has further increased with the opening of the new Chambal Bridge. There are several big cities like Gwalior, Indore, Bhopal, Jhansi, Kanpur, Lucknow, Agra and Delhi within a radius of 300 miles, i.e., a days motoring distance and if comfortable living arrangements are developed at the above mentioned attractive spots there will be a lot of visitors and the Restaurants should also do good business and be a source of income.

2. Provision of Motor Boats, Yachts for sailing, Rowing Boats and a few House Boats in Sakhya Lake

This can also be done at a reasonable cost by acquiring some of the boats available at Shivpuri and providing a few Rowing Boats. The lake has a beautiful setting and the availability of Boats at reasonable charges will be a big draw. These boats can also be kept as a

part of the Hotels and would provide a sufficient income to maintain them and pay back their capital cost within a few years.

3. **Fixing a Gauze Screen** to portion off a part of the Lake in front of the proposed Hotel at the Sailing Club site to free it from crocodiles and make it suitable for swimming, surf riding and water skiing as is done in Nagin Lake and Dal Lake in Srinagar. A Swimming Boat can be provided or this can also be a part of the Hotel with free swimming for residents and Boating Surf riding, etc., on payment. For visitors a fee can be charged for residents of Shivpuri and other non-resident visitors.

4. **Provision of Two Good Taxies**

These can be maintained by the proposed Hotels or the Madhya Pradesh Roadways as is being done by U.P. Roadways in many Tourists centres. This is most essential for sight seeing such as (a) Badhaiya Kund Spring (b) Drives in the National Park (c) Chhatri Gardens (d) Surwaya monuments and Narwar Fort.

5. **Development of the National Park**

In spite of the Government's desire to develop this beautiful area with a net work of good roads, nothing substantial has been done for developing Wild Life. I feel this can best be done by having a special officer for the Park with adequate staff provided with conveyance to ensure proper supervision and prevent poaching so that Wild Life can be developed. Arrangements should also be made for breeding of deer, Cheetal and other animals and then letting them loose in the Park to develop it quickly. If necessary animals should also be brought from outside to make up deficiency of Wild Life caused due to unrestricted poaching and destruction during recent years. This National Park if properly developed and run can be a very big attraction for foreign Tourists and visitors. All the natural requirements exist and it only requires proper planning and execution to develop this National Park quickly. At the time of the meeting of the Wild Life Board held at Shivpuri in 1959 all the visitors and members of the Board and Hon'ble Shri Punjab Rao Deshmukh were very impressed with the location, good roads and natural scenic beauty of the Park area and felt that speedy development would be best possible under an autonomous Board with His Highness Maharaja Scindia as the Patron or President and a local advisory body. I feel this suggestion should be given shape early and the National Park named as "Madhav National Park" (This has since been done.) in memory of the late ruler who was the builder of Shivpuri and the Park. If this is done effective steps can be taken for expeditions development of the National Park and even the management of Hotels Boating and sight seeing, etc., can be entrusted to the National Park Board.

6. Permitting fishing in the Lake

The Fisheries Department be asked to breed good quality of eating Fish in the Lake and Fishing Licences should be issued as is being done in many other places. This if properly developed can be a source of additional income from Licence Fee.

7. Arrangement for seeing and photographing—Tigers from the shooting Box on Lake

This can be done with the permission of His Highness Maharaja Scindia and a fixed fee can be charged for this. As the shooting Box has an ideal situation and is of beautiful construction this can be a very big attraction and source of income to the National Park.

8. **The present arrangement** of collecting keys from the Game Warden for visiting the National Park is also not convenient or practical for outside visitors. There should be one or two fixed gate manned by attendants of the National Park and they should have keys with them. A fixed nominal entrance fee should be charged as this would provide a source of income and no one should mind paying it. One attendant should accompany the visitors as a guide. Certain hours can also be fixed for visiting the Park and in their spare time these same gatesmen can go about to prevent poaching or also work as attendants on breeding nurseries which can be located near these selected gates and cordoned off to prevent breeding animals from escaping and outside ones from harming the breeders.

9. Publicity

This is of utmost importance and colourful posters and pamphlets and picture Post Cards of the various beauty spots, etc., should be printed and widely distributed through the Tourist Officer's in India and abroad. During the time of Gwalior State many such posters and pictures were printed and specimens are still available in the Collectorate Office. Prominent Boards should also be fixed on the National Park Highway and at the Gwalior, Jhansi, Agra, Delhi, Lucknow and Kanpur Railway Stations.

10. Conclusion

In due course after the above items are provided and tourists and visitors trade start developing a fair weather air strip can be made for convenience of foreign visitors and charter flights from big cities. A landing field suitable for landing planes upto the size of a Dakota can be made with very little cost at the site of the Camping ground on the A.B. Road. Similar fair weather strips have been made at places like Panna and have done a lot for the development of Tourists Traffic to Khajuraho. The landing strips can also be useful for the State Government.

The Cheetah

By

M. KRISHNAN

The last report of a wild cheetah (or hunting leopard) in India, so far as I know, is a sight-record almost 20 years old from near Chittoor in Andhra Pradesh, from an area in which cheetahs were not previously known. A nocturnal motorist had a glimpse of an animal which he identified as a cheetah, a sufficiently long glimpse for him to notice that it was not a leopard.

Now, in its somewhat grey-houndy build (it carries its body loose-slung, though like a cat) and solid spots a cheetah is distinct from a leopard, and not easily confused with it by one who knows both animals, but then leopards vary so much in build and size and markings, and both beasts are so indistinct in a yellow light (such as the glare of the headlamps of a motor-car in the forties) that one may hesitate to accept this sight-record as proven. And even if one does, that was the last ever heard of a wild cheetah in our country.

Fifteen years ago, hearing reports of the "sivungi" (as the cheetah is called in Kannada) in the country around the Tungabhadra Dam, I went there with friends to check. This was far likelier cheetah country, flat, hill-dotted scrub and jungle where the animal had long been known, but after a lengthy examination of all witnesses we had to conclude, regretfully, that no cheetah had been really seen—and even if it had been, the massacre of all wild life around the site of the dam had left it with no choice except to shift or starve to death.

The point of all this palaver is not to place the date of the cheetah's extinction in India as nearly as possible, but to add that when I said recently in the course of a series on our wild life, written for India's best-known weekly, that the cheetah or hunting leopard had become extinct here within the past 20 years, readers wrote both to contradict and to corroborate me. The contradictor referred to his having seen the cheetahs of the Maharaja of Kolhapur, kept for hunting buck—apparently he did not know that they had been imported from Africa. The corroborator said that the trade in cheetah-skins in the sub-Himalayan region had finished off the animal—was he thinking of the snow leopard?

With popular knowledge of our wild life so vague even among enthusiasts, I need no justification or excuse for reiterating the main, well-known facts about the cheetah.

It is distinguished from all the greater cats in that its claws are only semi-retractile—that is, it cannot withdraw its claws fully into their sheaths, so that they are always exposed, and

blunted like a dog's. It is the size of a medium-sized leopard, but longer and thinner in the leg, generally slimmer, and with a long fluffy tail, a small head, and solid black spots—the spots never form rosettes as in the leopard—on a tawny to greyish-ochre ground.

For the first two furlongs it is easily the fastest thing on legs; it is the only animal that can run down blackbuck within that distance, and can hit top speed almost straightaway from a crouching start, a typical cat talent. It has been timed over short distances with a stopwatch, and though not hunting in such runs, it has demonstrated its ability to spurt at well over 60 m.p.h.

Cheetahs had a wide range, till comparatively recent times, over Africa, Asia north of India, and India, frequenting flat, hill-dotted country where they could use their stupendous speed to run down their quarry, which often consisted of antelopes—in India, blackbuck, chinkara, hares, and other small animals of the flat country (including ground-birds) were their main prey.

Only in our country was the art of training cheetahs for the hunting of buck and gazelle for men developed—only adult cheetahs, which had already learnt how to chase and overhual the swiftest antelopes, were of any use for the sport; in a few days these were tamed into submission, and led on a rope lead, like large dogs, and became tolerant of human company. The sport reached its zenith during the days of the Great Moghuls, and was popular for centuries thereafter with princes and chieftains.

Cheetahs never attack men unprovoked, and even when provoked prefer to retreat—a thing they can do easily, being so fleetfooted. I believe there is no case on record of a cheetah having attacked a man in our country, but occasionally they used to take a goat or some other small animal from villages skirting the jungle. Cheetahs are now extinct in Asia—the Deccan, in India, was probably their last stronghold in Asia. They are still to be found in Africa. There is no difference between the African and Asian cheetah, and it is now realised that the King Cheetah (with a very richly coloured coat) is only a local variety of the African cheetah and not even a sub-species.

People may ask: Why can't we reintroduce cheetahs into India? We can, but first we must have a realistic appreciation of the reasons for the extinction of cheetahs in our country, and must be sure of our ability to ensure certain factors. It was the occupation of the flat country by our growing humanity, and the decline of plains forests all over India, that was the main cause of the disappearance of the cheetah here.

Are there any flat-country forests left, adequately stocked with the buck, gazelle, and other natural prey of the cheetah, into which we can reintroduce the animal? Can we offer it, and also its prey full protection from poachers and trappers, with our Governments so reluctant to appoint adequate protective staff even in sanctuaries?

And even if you feel enthusiastic about our wild life and realise the wisdom of reintroducing a lost species before too many changes overtake its old homes in India, of what use is the strength of your feeling, with the invincible ignorance of our Government departments so exclusively in charge of our wild life? I am afraid these questions need to be answered before any attempt to reintroduce the cheetah into India can be made.

Wildlife Deserts

The Dehra Dun forests of the U.P. are among the most intensively managed in India. With a network of good forest tracks and the first class roads leading into the town of Dehra Dun, almost everything, even the bark of sal trees, is saleable and nothing which can be sold is ever left behind. The management prescriptions provide for a continuous skimming of the forest—first the main fellings, then the subsidiary fellings and finally the ‘cleanings’ which remove the broken and mis-shapen trees. The cultural Jemadars see to it that there is no waste of saleable material, and the result is a very ‘clean’ forest, as Indian forests go.

In fact, sometimes it appeared to me as if they were overdoing the fellings. During the years 1955 to 1960, when I was in charge of the Forest Colleges and used to go out on excursions with the students, I would often pause at spots where there were gaps in the crown and ask our guide why the tree had been removed. Invariably he would say that it was dead or crooked, but the answer never gave me complete satisfaction and I was never free from the uncomfortable feeling that the forests were being squeezed dry. The foresters had never heard of the concept of forest management practices being made to serve the needs of wild life, as I was learning from the books I was then reading for the preparation of my own manual on management of Indian Wild Life. To the Working Plan Officer there was only one aspect of wildlife—and that was the *damage* aspect: he was expected to record under the

head 'injuries to which the crop is liable', the habits of elephants and bears stripping the bark from the trees, of sambhar browsing plantations, of porcupines, growing seedlings and so on. There was no conception of adjusting his prescriptions slightly so as to assist wildlife: the leaving of some hollow trees to serve as nesting places for owls and similar predators of rodents, the principle of 'edge effect' as an encouragement to wildlife abundance, and so on. When I tried to get the Working Plan Conservator to insert something positively helpful to wildlife in the working plan for the Doon forests I met with no success. It was business as usual! The 'major' partner, revenue, was very much in the saddle and the 'minor' partner, wildlife, was still not considered as worthy of a place in the sun. Even wildlife censuses were yet to come.

Today while browsing through the latest number of 'Scottish Forestry' I came across a delightful account of a little girl's love for wild creatures prevailing over the hard-headedness of a woodland manager and, in a flash back to those days in the Doon forests, I am tempted to give the story here—slightly abridged and a little out of context—in the hope that it will catch the eye of the Indian forester¹, and in particular those in charge of working plans.

The working plan for the woodlands of a particular estate in Scotland had been drawn up clearly to stress the commercial aspects. Yet there was always a conflict between the forestry requirements and the shooting interests. Came the time for thinnings to be done in a particular wood. The market for timber was high, the labour force and extraction equipment was on hand, yet the forest manager hesitated. The area had been carefully nursed by the game keeper as a breeding ground for pheasants and the nesting period was on. The coming seasons's shooting would depend on non-disturbance of the area. True it would be immediately underplanted with rhododendron, berberis etc. to provide cover and winter food for the following season's birds and during the fellings every effort would be made to minimise the disturbance by careful selection of extraction routes and detours as to leave as much area undisturbed as possible. The game keeper reacted in the expected manner when told about it: but the thinnings had to be done and the order was given.

The work was well in progress when one morning the game keeper's little daughter was found passionately crying. Patient questioning revealed the cause of her agitation: the felling was going to disturb the nesting of an owl and she was to be deprived of the sight and experience of the fluffy little owl babies unless something could be done to stop it! The forest manager was persuaded to go with her to the spot. He was led to within a few yards of a group of trees and was shown a beautiful tawny owl, sitting bolt upright in a forked root

at the base of a tree. It was almost impossible to distinguish the bird, so cleverly had it camouflaged itself by packing the bark of the tree into coloured flakes for about a foot above and to each side of her sitting motionless, the owl was almost impossible of being distinguished from the surrounding bark. Three adjacent trees had been marked for felling and there was no doubt that the nesting place would be ruined.

The hard-headed woods manager looked around and then down at the little girl's tear stained face. He said nothing, but reaching for his knife he cut the necessary "cancel fell" notches on the trees. The next day the fellers entered the area but the owl's house was saved. And in due course the little girl saw her baby owls.

As for the woods manager, he duly took part in the shooting. This, of course, was not up to the usual expectations, which was perhaps why when he reached home after the shoot he found, in the boot of his car, not the expected brace of pheasants but a number of billets of wood. 'Just Deserts' perhaps (which was the title of the story)—but it seems more appropriate to call mine 'Wild Life Deserts'.

With acknowledgements to Scottish Forestry, July 1 '65.

P. D. Stracey.

How They Do It Elsewhere

TANGANIKYA

The last stage of "Operation Noah"—the massive rescue of game from the rising waters of Lake Kariba—is almost completed. Rhinoceri are being rounded up by the use of dart-guns, which fire hypodermics of morphia and temporarily anaesthetise the animals. When they lose consciousness they are hoisted on to a truck and taken to the safe game reserve. Seventeen rhino already been rescued from the threatened area near where the Sengwe river joins the Lake. Some 20 more remain to be taken away.

New Trends

This year the Indian Board for Wild Life and the Uttar Pradesh Board for Wild Life both held their annual meetings in the sylvan and peaceful atmosphere of the Corbett National Park disturbed only by the alarm call of the CHEETAL or the bell of a Sambhar, the sawing guttral noise of a panther on the prowl or the roar of tigers roaming at night seeking their prey. Wild elephants were not far away on the river beds as it was the first week of June when water is scarce. It is hoped that in future meetings will be held in forests so that members of Wild Life Boards may have a closer acquaintance with the animals to be preserved for posterity and get a correct idea of the present status of wild life in protected forests.

The Government of Uttar Pradesh, represented by the Minister of Forests, Shri Charan Singh played the host and the organisers deserve to be congratulated on the perfect arrangements they made for the stay of the members of the Wild Life Boards. Shri Charan Singh welcomed the members of the Indian Board for Wild Life and presided over the deliberations of U.P. Wild Life Board. He is keen on preserving Wild Life and is prepared to work any practical suggestions that may be offered in this connection. A new Bill for Preservation of Wild Life in Uttar Pradesh is on the anvil under his direction.

INDIAN BOARD FOR WILD LIFE

Recommendations

The Indian Board of Wild Life recommended:—

- (a) The publication of News Letter Bulliten on a half yearly basis to start with.
- (b) The starting of conservation clubs in Educational Institutions.
- (c) The bringing out a new series of Wild Life Stamps on Indian birds.
- (d) On the initiative of His Highness Maharaja Sahib of Nabha the board recommended that State Governments should take adequate steps against trapping and sale of birds and game meat and secure proper implementation of game laws.

- (e) The planting of bird food trees on roadside avenues.
- (f) The establishment of water bird sanctuaries.
- (g) The taking of adequate steps to preserve wild life in areas outside reserved forests.
- (h) The institution of an advanced course on wild life management at the F.R.I. and Colleges at Dehra Dun.
- (i) The sale and export of Musk being completely banned.
- (j) The creation of more sanctuaries and prohibition of grazing of domestic cattle in Parks and Sanctuaries.
- (k) That State Governments should formulate definite schemes for setting up games farms.
- (l) The consideration of the National Wild Life Policy being referred to the Standing Committee of the Board.
- (m) The Board sought protection for elephants in Mysore State.
- (n) Suggestions regarding adoption of a National Animal being invited from the States.

Recommendations of U.P. Wild Life Board

The Board recommended that:—

1. Forest Officers be permitted to entertain guests in the first fortnight only and three times in the shooting season.

2. No bounty should be paid on shooting Blue Bull in Forest areas.

Approximate number of Blue Bulls in various districts be enquired from the District Magistrates and the public should be told that Blue Bull is an antelope and not a cow.

3. Recommendation the lion be adopted as the National Animal of India, if necessary, be sent to the Indian Board for Wild Life.

4. Enquiries should be made from the Forest Research Institute and Colleges about research facilities for wild life conservation and wild life course in their existing syllabus, Facilities for such research should be offered to F.R.I. in National Parks and Sanctuaries. Enquiries should also be addressed to the Universities in this connection and the Universities

be informed that the Government will consider grant of Scholarships to students who work in this field.

5. Wild Pig be removed from the Vermin List.

6. The Chief Conservator and the Secretary Forest Department meet and suggest measures for preventing misuse of Shooting Permits for purposes of entertainment of strangers as guests and consequent financial advantage to the permit holders. The permit holder must be present in camp when there is a shooting party in a Forest Block.

7. There could be no restriction on the number of Shikar Companies in the State.

8. The appointment of Honorary Wild Life Wardens in areas outside Government Forests was recommended.

Planning Commission

A meeting on Wild Life Preservation was held on 23rd April, 1965 in the Planning Commission under the Chairmanship of Shri C. Subramaniam, Minister of Food and Agriculture, Government of India. To this meeting many of the persons and organisations actively engaged in Wild Life Preservation and Research were invited.

A summary of the Minutes is given below:—

Prof. M.S. Thacker, Member (NR), Planning Commission, thanked the Minister for Food and Agriculture for kindly agreeing to preside over the meeting. He then pointed out that despite all the efforts of the Forest Departments of the country and the work done by the Indian Board for Wild Life, complaints are still being received that wild life is not being adequately protected and certain species have already disappeared and others have diminished considerably and are on the verge of extinction. It has even been suggested that to improve matters another division/department under the Ministry of Food and Agriculture may be set up. It may be desirable to carry out ecological survey. We might also examine how the danger to wild life can be minimised even when using insecticides and pesticides. He requested the participants to suggest measures that might be adopted to more effectively protect wild life of the country.

The Chairman, Shri C. Subramaniam, Minister for Food and Agriculture, pointed out that everyone is interested in the preservation of wild life. As we are in the process of considering the Fourth Plan, it would be desirable to discuss this subject and then to allocate adequate funds for the purpose. In asking for allocations it would be necessary to identify definite programmes. It would also be desirable to decide what would be the most suitable machinery for protecting wild life.

Shri V.C. Shukla, M.P., pointed out that the main difficulty was lack of implementation of the recommendations of the I.B.W.L. He suggested that the working of the Forest Departments should be suitably modified, for instance, there should be no forest villages inside the National Parks and Sanctuaries as the village stock reduces the amount of grazing available and acts as a source of infection to the wild animals and the villagers also destroy wild life. He further suggested that forestry operations should be mechanised. Destruction of wild life should be made a cognizable offence and the Forest Act should be rigidly enforced. There should be a separate Wild Life Service under the over-all control of the Head of the Forest Department in the State as has already been done in two or three States.

Shri M.D. Chaturvedi, Ex-Inspector General of Forests, traced the history of measures taken from time to time to preserve the wild life of the country and how this led to the appointment of a Committee in 1952 in the Ministry of Food and Agriculture with him as the Chairman to consider ways and means for the preservation of the wild life of the country. On the recommendations of this Committee the Indian Board for Wild Life was constituted by the Government of India. This Board has been doing very useful service ever since. Besides this, the Bombay Natural History Society has also been rendering yeoman service in the last 50 years for preserving the wild life of the country. He suggested the creation of a Central Organization with adequate powers, working in the Ministry of Food and Agriculture and under the guidance of the Indian Board for Wild Life. He also suggested that the States should be given adequate financial help for the management of their wild life in National Parks and Sanctuaries.

Mr. E. P. Gee submitted a four-point memorandum for the consideration of the Chairman.

H.H. The Maharaja of Baroda emphasised the need for having a separate organization with sufficient funds for looking after wild life.

Shrimati Rukmani Devi suggested that forestry should be a Central subject and the Indian Board for Wild Life should be given more powers and funds to effectively protect wild life. Export of wild life should be banned, and crop protection work should be done by the Wild Life Wardens instead of giving guns to the villagers who use them for indiscriminate destruction of wild life.

Shri Hari Dang also submitted a Memorandum for consideration. He further suggested that effective steps be taken to protect the wild life in the Himalayas along the border.

The Chairman appreciated the efforts that are being made by the Forest Departments and the Indian Board for Wild Life and private institutions like the Bombay Natural History Society and assured that he will give all the help that will be needed for more effective protection of wild life.

His Highness the Maharaja of Nabha emphasised the need for publicity.

Shri R.C. Soni suggested that the Department of Tourism should confine its activities concerning construction of residential accommodation and providing other amenities for the tourists just outside the National Parks and Sanctuaries and not inside them.

Prof. Seshachar endorsed the suggestion to conduct an Ecological Survey to determine correctly the status of the various species of wild life and their natural habitat.

Shri D.N. Banerjee stated that the Ministry of Commerce has been permitting the export of wild life and wild life products with the concurrence of the concerned Ministry and would continue to do so.

Shri J.C. Mathur suggested that the recommendations should be made under four heads: (i) funds needed; (ii) administrative set-up required; (iii) policy decisions; and (iv) education including publicity.

Prof. Thacker proposed that a small Committee be formed to draft the recommendations.

Accordingly, the following recommendations were made:—

The meeting recommends as follows:—

1. Funds

Adequate funds be made available in the Fourth Plan for the effective conservation of wild life including such aspects as protection, management, preservation, development of sanctuaries, national parks and breeding farms, collection of information, education, publicity, survey, etc. To give impetus to the programme, the scheme should be centrally sponsored.

2. Policy on matters of all-India interest

Policy decisions should be taken on some matters of all-India concern such as (i) uniform legislation; (ii) export of wild life and wild life products; (iii) issue of gun licences, restriction on manufacture, import and sale of certain types of ammunition; (iv) problems concerning tribal and rural welfare vis-a-vis wild life preservation in and near the forests; and (v) patterns for sanctuaries and national parks.

The Committee requests the Ministry of Food and Agriculture to prepare and forward to the National Development Council of the Planning Commission, and where necessary to the Cabinet, memoranda on these matters with a view to obtaining directives. In compiling these memoranda, the Ministry may take into consideration the recommendations made from time to time by the Indian Board for Wild Life and also consult concerned ministries and where necessary, State Governments.

3. Administrative set-up

- (a) A separate Wild Life Division should be constituted in the Ministry of Food and Agriculture with a whole-time officer of adequate status assisted by necessary technical and administrative staff. Likewise in the Forest Department of each State, there should be a Wild Life Circle with the necessary administrative and field staff.
- (b) The Standing Committee of the Indian Board for Wild Life should be reconstituted into a smaller body consisting of persons who can be readily available for a meeting at least once every two months. The reconstituted Standing Committee should function not only as the Executive of the Indian Board for Wild Life but also as a Technical Advisory Committee to the proposed Wild Life Division.

4. Education including publicity

- (a) The publications Sub-Committee of the Indian Board for Wild Life should prepare a self-contained and comprehensive statement covering all aspects of information, public education and training concerning wild life conservation, and incorporating also matters that have been raised from time to time and also the memoranda placed before the Committee. This statement should provide the basis for programmes on these matters and should enable the Indian Board for Wild Life to advise authorities concerned and to keep a watch over the progress of education. The Ministry of Education should also be associated with Publicity Sub-Committee.
- (b) An expert scientific inventory of India's wild life resources, including national parks, sanctuaries and equivalent reserves should be made by competent ecologists.

Lastly, the meeting placed on record its appreciation of the presence of the Minister for Food and Agriculture and the assurance given by him that all help needed for the preservation of wild life will be given by his Ministry.

Two signed memoranda were also submitted to the Planning Commission.

1. The responsibility for the preservation of wild life in India should rest squarely with the Forest Departments, both at Central and at State level. It should be noted here that the vast majority of wild life in this country exists in the forests. In the areas outside the forests where wild life is found, the Wild Life Warden of a State should be made responsible for the preservation of wild life in collaboration with the civil authorities.

2. In order to enable the Forest Departments both at Central and at State level to discharge their responsibilities effectively, the following steps need to be taken:—

(a) *Centre:* A separate Wild Life Wing should be constituted in the Ministry of Food and Agriculture with a whole-time Secretary of adequate status, assisted by the necessary technical and administrative staff.

(b) *States:* In each State there should be a Wild Life Circle attached to the Forest Department Organization, with the necessary administrative and field staff for the preservation of wild life. As a matter of fact, such a Wild Life Circle or Division already exists in certain States, as in Uttar Pradesh. In those States where it does not exist, steps should be taken to follow suit. The Centre should provide the necessary assistance to the States for the purpose.

3. In order to provide suitably trained men for the purpose, advance courses in wild life management should be instituted at the Forest Colleges at Dehra Dun.

4. In order to determine correctly the status of the various species of wild life and their natural habitats, advantage should be taken of technical aid programmes for bringing expert ecologists of international repute to India.

1. The Indian Board for Wild Life should be reconstituted and strengthened and given statutory status. A full-time Secretary, office staff and library should be provided to act as a clearing house of information and expertise on wild life conservational techniques.

2. A course in wild life ecology should be included in the syllabus of the Forest Research Institute and Colleges at Dehra Dun.

3. The Forest Services at the Central and State level should be charged with wild life conservation, and Specialists in this field should be injected into the States' cadres, possibly by the provision of separate wild life 'cells' or departments.

4. The services and enthusiasm of amateurs and voluntary and honorary workers should be inducted in this work at the State and Central levels to ensure that enthusiasm

and the views of legitimate sportsmen and amateur conservationists are kept in mind in legislation and implementation. It is submitted that this can be a source of tremendous effectiveness in the Conservation Ideal, as it is all over Britain, Africa and the United States. Wherever possible, institutionalised procedures should be adopted by way of provision for the appointment of Honorary Wild Life Wardens, thus saving valuable revenue and spreading the Conservationist Ideal widely amongst the public who will eventually have to uphold and execute it in the flesh.

5. It is submitted that a very urgent and crying need exists for a separate crash programme for saving the wild life of the Himalaya from imminent decimation and destruction. The animals and birds of the higher elevations have a very low temperate region reproductivity-rate, and the intensified troop-activity and general armed force movement at higher altitudes and in the border marches of the Himalayas have led to a situation when several species, though not yet on the official Threatened List, are nearing the point of no-return. Amongst these, the Musk Deer, Snow Leopard, Ovis ammon, Ibex, Thar, Kashmir Stag, Sikkim Stag, Serow and Thakin. In this context, the army commanders and other administrators involved should somehow be brought into a Himalayan Wild Life Committee to discuss measures and ensure implementation. Himalayan wild life is the rarest and most unique wild life group in the world. If we lose it, India will be the poorer by its crowning glory.

6. The preparation of a text-book on Indian wild life should be given immediate priority. In this context, The Indian Wild Life Text-Book Project, sponsored by the Wild Life Preservation Society of India, might either be taken over by the I.B.W.L. or otherwise assisted to a speedier and more perfect production.

Visit of International Union for the Conservation of Nature and Natural Resources Delegation to India

Wild Life Conservation enthusiasts will be delighted to learn that an International Delegation consisting of members of I.U.C.N. and Natural Resources will be visiting India in the last week of November. It will include eminent workers in the cause of Wild Life Preservation like Prof. Bouliere, Peter Scott, and H. Elliot, Secretary General of I.U.C.N.

The Planning Commission and the Government of India have drawn up an interesting programme for the meetings and a visit to Bharatpur Bird Sanctuary. Voluntary organisations with the Bombay Natural History Society and the Wild Life Preservation Society are participating in the programme.

Enforcement of Wild Life Laws

When one reads the recommendation of Wild Life Boards and about the efforts of States for Wild Life preservation one is convinced of their pious intentions but when one looks at results achieved one is equally convinced that Wild Life is being exterminated. The reason is not far to seek and the remedy lies in strict enforcement of Wild Life Preservation Laws.

Wild Life is found in India on State land and Private land. Wild Life on State land is owned by the State but there is no owner of Wild Life on Private land and the human predator has a free hand. The protection that wild life had on private land has disappeared with the abolition of ZAMINDARI estates and the village institutions that have come into being give no such protection to Wild Life or its habitat.

The State Governments should take immediate steps to protect Wild Life on Private Lands, because much of the Wild Life of State Land goes out to Private lands only to be shot, snared and trapped; often in a cruel manner and out of season. There are also birds and animals whose habitat lies mainly on private lands. The disappearance of the Black Buck from the village scene in India is only one such example.

Will the Governments move now? Tomorrow will be too late.

R. N. Misra.

How They Do It Elsewhere

SOUTH AFRICA

Thirtysix people were arrested in the Kruger National Park for leaving their cars to watch two lions devour their buffalo kill. This was the highest number ever charged on one occasion in the park. The traffic officer who booked the offenders said: "It was not easy to arrest so many culprits at once, particularly when a roaring lion charged me."

Correspondence

Sir,

I would like to give you a report on the wild-life around Mhow in Madhya Pradesh:—

The almost total absence of big game is not surprising since it is being wiped out enmasse by poachers, the Armed Forces, Police and the villagers who own weapons which inflict a slow and agonizing death to the wounded animals. Also, the villagers are felling trees by the hundred so that the forests are being deprived of all forms of wild-life except birds and monkeys. The few leopards and the occasional tiger which roam the forests are also being cleared out by sportsmen in jeeps with spotlights who frequently roam the forests at night shooting cheetal, pig and anything (including hyenas) which may come in their way. The leopards, deprived of their natural means of getting food, turn to cattle-lifting from the villages. These the Shikaris shoot without permits; the forest guard accepts a small bribe from them and lets them shoot anything. The lack of forest officials in this area is the main reason for this. I have spent nights out on machans and never have I heard deer calling as in the past year.

The Army in Mhow, having answered the Society's Appeal is prohibiting deer and other big game shooting by officers and (to an extent) civil sportsmen without permits.

The fish are fighting their greatest fight—the fight for survival. They are being bombed and netted daily by the locals and no notice is being taken to correct this heinous crime.

It appears that the conservator of forests in Indore has no idea whatsoever about the destruction of forests being carried out by villagers here. Daily, I see long lines of women carrying loads of wood go past the house to the market. Repeated complaints have had no effect. If this could be brought under control, then not only would wild-life appear in these forests again, but also the vegetation would help greatly in holding the soil together which at the moment is disappearing with every shower of rain.

I sincerely hope some action will be taken in the near future for the preservation of wild life in this area.

Mhow, 30 June 1965

Yours etc.,

Kamal Prasad.

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SNAKES EAT FISH

Sir,

I first discovered this peculiar habit of certain snakes to live in water and eat fish some years ago. While fishing in a large pool below my house I was amazed to see a large snake (probably a viper) stick its head out of a hole in the side and lie in wait for an unwary tiddler to come his way. I was further amazed to see him come out a bit more from his lair, snap at quite a large fish, and holding it in its mouth retreat back into his hole.

Looking carefully along the sides of the pool I saw over a dozen snakes doing the same thing. Below the fall which fills the pool were some more snakes looking upwards. As soon as a fish came tumbling down in the torrent of water, a snake would open its mouth, and with unerring aim the fish would go down the fellows mouth. I watched this for over an hour, fascinated, and not once did a snake miss a fish

Once I saw a huge cobra swimming in the water grab a $\frac{1}{2}$ pound fish, swim to the bank, and hood up, sway from side to side with the unfortunate fish in his mouth, before eating it.

Some snakes lie on the bank next to the water, and when they see a tiddler, they make a quick grab for it, bring it out on the bank, drop it from their mouths, and watch it die before gulping it down.

It is very difficult to spot snakes in nullah or, as in my case, in pools, as they only stick out 6 inches of their heads out of the water, and their colour being practically the same as that of the earth or stones, they are very well camouflaged. It was only by looking very carefully that I spotted them. Normally, they look like stones on the bank. They are extremely cunning and put their heads in as soon as they feel or hear something unusual.

K. Prasad,
The Doon School.

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Sir,

Permit me to submit a few proposals regarding fishing rules and the system of permits given out to people using rod and line.

1. Last year the Forest Department raised the fishing fees from Rs. 2.00 to Rs. 10.00 P.M. Though the increase was not justified, as no compensatory facilities were provided to protect the fishing waters in the Doon, we have come to accept the increase.

But having only one type of permit, i.e., a monthly one, is not very convenient to a large number of fishing enthusiasts. Most of them are from the middle income groups and are working-men of Dehra Dun. They can only make use of their monthly permits on Sundays. Out of the four one seldom makes use of more than two, which means that such people pay Rs. 10.00 for two days fishing.

I suggest that a system of day permits may be introduced. A fee as high as Rs. 2.00 may be charged per day. This would also give the angler a chance to take a permit of a different division on a successive Sunday for a change of scenery and fishing conditions. Otherwise, for an angler to fish in both the divisions of the Doon in a particular month, would require getting two permits of Rs. 20.00 according to the existing rules. Definitely, a very discouraging prospect for a middle income group angler.

2. I would also request you to forward plans to the U.P. Government to legislate to bring the panchayat waters under the forest or the fisheries Departments. There has been speedy depletion of the fish population in the waters of the Doon, through poaching, netting, use of night lines and worst of all 'bombing'. To allow the commercial exploitation of 'mahseer', the greatest game fish, is to lose sight of priorities of sport in the development of the country. These very waters, with proper maintenance and scientific management could be the envy of other states and could rival the famous salmon waters in U.K. and Europe, which draw anglers from all over the world, paying fantastic sums.

3. If the Forest Department, is short of man-power, I would suggest that some honorary officers may be appointed to help the guards in the task of watch and ward. There would be a number of people from the public who would perform these duties without any privileges, appended, with it.

In getting No. 1 implemented soon, I am sure you would help genuine anglers become faithful to the rules and make them fish with a clean conscience.

Yours faithfully,
R.D. Singh.

To

The Editor 'Cheetal'
W.L.P. Society of India
for publication in the October Issue.

Convener Fishing Sub Committee
W.L.P. Society, Dehra Dun.

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I certainly enjoyed reading your article on Himalayan Wild Life in the October 1964 issue of *The Cheetal*, but more so your report on the vanishing Black Buck as I am acquainted with some of the regions which you write about and realise with concern the rate at which their numbers dwindle.

What prompts me to write this letter, however, is the remark made under "Bengal" in 'From the States', complaining about the contradictory reports you keep receiving from correspondents on the states of wild life in that area. I was last in the Sunderbans two years ago and as I do not think that conditions could have changed considerably over this period, I would like to add my tuppenny worth for what interest it may be to your existing collection on the subject.

I had a permit to shoot tiger, pig and crocodile. During the 8 days that I was in the Sunderbans on that trip I observed the following:—

1. A number of herds of *cheetal*. In fact almost every grassy clearing had either a herd grazing on it or signs of a herd having been there lately.
2. A few *wild boar* tracks, but certainly not as many as I had been led to believe.
3. Innumerable signs of *tiger*, both in the shape of tracks wherever we landed (we were operating from a launch, waterways being the only way to get into the Sunderbans) and two men killed during that period of 8 days—a woodcutter whose body was rescued by his fellow workers who courageously went to his rescue, and a honey collector, of whom no trace was ever found. I sat over the spot on a small tree—almost all the vegetation in the Sunderbans is stunted, probably because of congestion and overgrowth—but the tiger did not return and as I had no bait I moved on the next day.

At the end of the year I saw a newspaper statement saying that 264 men had been killed by man-eaters in the Sunderbans that year. I should think, if anything, the actual number would have been higher as a number of these incidents do not get reported.

4. Two *crocodiles*, one of which I shot. Later, the local D.F.O. told me that I had been exceptionally lucky in seeing two of these creatures, as they are now so rare that he, in 6 months, had himself seen no more than two.

5. One *fishing cat*, fishing.

In conclusion I would like to make the following observations which I know will be found controversial:—

- A. As far as I know there is no fresh water in the Sunderbans and as such all animals in the area must have attuned themselves to living on saline water. If you think this is possible, do you know of any other areas where this has happened? From my own brief experience I can say that washing and brushing teeth with saline water (the drinking water that we carried, naturally had to be conserved) was an unpleasant job at the beginning but gave us no bother at the end of the week.
- B. The man-eating tigers in the Sunderbans are such by choice, not because they are wounded or deprived of their natural food or for any of the other reasons that tigers elsewhere turn to killing humans. Because of the inaccessibility of the forests, there is little enough shooting down in the Sunderbans (except from boats, which only accounts for crocodile and deer) and as such there is no cause for tigers to learn to hate man with consequent slayings. Also, remember that woodcutters and honey-gatherers move into the Sunderbans only during certain months, and during the rest of the year the forests are left entirely to the animals that inhabit them. I am, therefore, led to believe that the Sunderbans tiger, fed up of venison and occasional pork turns to man when he gets the opportunity to change his diet which becomes a seasonal phenomenon. If this is acceptable the logical corollary is that the tiger also seasonally changes his nocturnal habits. Extraordinary I admit, but can you advance any other theories?

The Sunderbans are a weird and eerie place, expensive to operate in, inaccessible, forbidding—but holding a fascination all their own that will certainly drag me back some day when I can make it. You can then expect to be bored farther by me.

In the meantime, I shall certainly look forward to hearing from you and other Members on what I have above recorded.

Yours sincerely,
D.N. Mazumdar.

(*Statesman* 1st February, 1965)

The bulk of Calcutta's firewood comes from the Sunderbans, that wilderness of densely forested islands at the mouth of the Ganges over which the Forest Department rules supreme and where pelicans roost. Some 2,000 woodcutters, mostly from Orissa and Bihar, spend

their days under contract chopping away at the stunted trees and mangroves; their nights on a fleet of boats in deference to the Sunderbans tigers. Because, as anyone who inquires soon discovers, the Sunderbans tigers are man-eaters. According to unofficial statistics they take an average of 30 lives a month. The 1965 count is alleged already to be 60, which makes of woodcutting a disproportionately hazardous occupation since it seldom pays more than Rs. 2 per day.

Honey collectors, who also operate in the Sunderbans, fare worse since they are seldom protected and work singly or in pairs. The woodcutters go to work much like troops into action. They are preceded by a barrage of crackers and "bombs" that intimidate the less persistent of tigers. But, as an experienced shikari assured us, man-eating tigers are extremely clever, bold, and calculating. They watch without being seen for hours on end knowing that someone will eventually stray from the crowd.

From a quick check with shikaris we know we have discovered that shooting in the Sunderbans is not exactly fun. First the jungle is treacherously dense, visibility measured in feet, the ground often slippery underfoot. The use of machans is seldom practicable since few trees are more than eight feet high. This means shooting on foot with the advantage of surprise entirely with the tiger. The whole place is infested with poisonous snakes so that the wise shikari pads his trousers and wears boots. Nights must be spent in a hired launch (cost Rs. 350 per day). No fresh water is available.

On the credit side is the helpfulness of the forest rangers and the unending beauty of the area. But we have heard complaints that shikaris are not exactly encouraged which seems surprising when so many lives are at stake.

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On page 11 of *Cheetal* forr October 1964 you asked for information on Dachigam. I visited this sanctuary with my wife in September 1958. I had been in correspondence with the Forest Department; Srinagar for over a year before my visit and yet nothing was arranged when I arrived. They first sent us to Ovra and one other place so that we lost the opportunity of visiting Upper Dachigam because the weather had broken. Then we were made to camp like gypsies at the sanctuary gates because it was part of the water catchment for the city. Everyday large numbers of grass cutters entered the sanctuary and also the army to destroy old ammunition. There was an excellent rest house inside the sanctuary which was reserved for V.I.P.s We did eventually see one or two Stags in the late evening and there was a small herd of Hinds.

From the stand point of a naturalist visiting India to photograph wildlife the arrangements at Dachigam were completely hopeless. It should be possible for visitors to use the excellent rest house and also to make arrangements in advance for visiting Upper Dachigam and using the rest house there also. This should be possible without having endless discussion with the Forest Department and eventually being put off by a lot of excuses about accommodations and transportation. The duration of our visit to Kashmir was from end of September until October 20th approximately.

Yours sincerely,
Dr. T.H. Bossett.
Canada.

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Black Buck

Dear Sir,

I am very much pained to inform you that the poor Black Buck's position is as precarious here as elsewhere. A reliable villager told me that, fifteen years back, Black Buck was a common sight around his village—five miles from here—but they are now *totally* gone and some stray Blue Bucks (not seen before) have taken their place. All the scrub jungle has been cut down and Black Bucks shot out by local shikaris.

A report from a place, about 26 miles away, says that six females were observed there recently but no male could be seen. There might be one but that is no consolation when only twelve or fifteen years back, I am told, large herds roamed about the countryside. Here also the destruction of cover and shooting are the main cause of their disappearance. Again the Blue Buck seems to be replacing the Black Buck. Perhaps the name 'nilgai' is shielding its hide in a predominantly Hindu locality. Poor Black Buck was not so sacrosanct and hence was driven to the Happy Hunting Grounds.

In my home district—Bulandshahar—Black Buck was abundant till the land hunger consumed it. Till very recently, there were still quite a few around my village, some 12 miles north of Bulandshahar, when the evil eye of some foreigners fell upon them and their modern rifles made short work of many of them. The remainder are being exterminated by local shikaris through professional hunters and trackers called 'Aherias'—basket makers by profession but ruthless and determined poachers as are the other ex-criminal tribe the 'Sansis' who, besides the buck, take a heavy toll of our national bird, the peacock. But who cares?

V. S. Sirohi.

Reviews

A Review Article on "The Passing of the Forest Gods" by Augustus Somerville (Thacker and Spink; Rs. 12.00).

The plain, unvarnished truth in shikar accounts will generally prove more acceptable to the knowledgeable reader than hair-raising flights of fancy. This is because real adventures have an element which may best be described as vital. This vitality is absent in fiction, unless the writer knows his subject well enough to write fiction which could actually be the truth. There must be no false notes, which naturally will be absent when actual fact is recorded. In the world of adventure the truth can be at times even more exciting than anything a writer of fiction would dare write, assuming that he were after the impression of writing from true experience. Thus we get the amazing shikar stories of Jim Corbett, which ring true and clear, because they are clearly accounts of what actually happened. On the other hand we get books describing mediocre shikar experiences which are full of false notes, notwithstanding that the comparatively common place in shikar is described. When reading a book on shikar we should be on the lookout for the false notes.

The author describes on page 10 how a tiger rushed at him roaring defiance, and how he stopped the charge with a 12 bore bullet in the chest at ten paces. He then goes on to say that the tiger's mate charged him with a *moaning* growl. Now while a moaning sound is included in the noises made by a tiger, when it charges a man it invariably gives vent to a series of *coughing* roars, exactly as made by a leopard when charging, except that the volume of sound is naturally much greater. No one who has faced a charging tiger or a charging leopard could confuse the sound with a moan.

I must confess that the author was amazingly lucky in stopping a charge at ten paces from an angry tiger using but a 12 bore and firing into its chest. The Hon. W. Best maintains in one of his books that he has no illusions about stopping a charge from a tiger which *means to come in*. Of course, he refers to conditions when the sportsman is on foot. Apart from a lucky shot which injures the spine or brain, he feels that the beast is unstoppable as distinct from being killable. My own experience confirms this view.

Mr. Somerville relates in this instance that he took a snap at the tigress (which charged with a moaning roar) after it swerved away, not pressing home its charge, and he fired with L.G. from his shotgun. He frankly admits it was a foolish act. But the point is, could any really *experienced* shikari have done such a thing? A snap with a rifle, or even a shotgun

loaded with ball, yes. But with buckshot, definitely no. Mr. Somerville must be less experienced in shikar than he would wish his readers to believe. Not content with wounding this tigress in this manner, he eschews following her up, and hunts her by sitting up for her on a *machan* overlooking a game trail. He states that this effort was successful—he must be a very lucky man. But he must surely have been aware that the chances of so bagging her were slim (how could he be sure of a shot even if she did return?) and that every rule of sporting conduct called for him to *follow up* the wounded beast, and that delaying the attempt could well lead to her escape.

In Chapter 5 Mr. Somerville relates how a villager had killed a man-eating tiger by pouring Nitric Acid onto its face out of a bottle. He states that his informant claimed that this tiger drank almost nightly at a certain pool. Well, tigers do not reside in one place, but range a considerable territory, so how could it drink nightly at one place? Mr. Somerville's blind acceptance of this statement, on which the supposedly successful hunt depended, shows a lack of knowledge of the ways of tigers on his part. The account of the killing of the tiger is fantastic. The hunter poured Nitric Acid out of a bottle onto the face of the tiger while it obligingly stood there. A little thought will show that while a glass or mug of fluid could conceivably be dashed into the face of a tiger, it is quite absurd to visualise fluid being poured onto its face from a bottle. The whole account is absurd and on a par with Baron Munchausen. Incidentally, Kodarma is in Hazaribagh District, and as I have been living there since 1936 I would certainly have known about any man-eater in the area not to speak of it coming to such a preposterous end. The supposed death of the man-eater must have taken place after 1936 as Mr. Somerville refers to the use of a jeep, and jeeps only became available in the '40s.

On page 96 the author refers to coming up on a herd of bison in the open, with absolutely no cover nearby for the animals to retreat to. Well, anyone who knows his gaur cannot visualise such a situation in *daylight*, when these animals would invariably *be in* cover. Such an occurrence could only take place *at night*. But surely Mr. Somerville would not be so unethical as to hunt horned game after sunset?

In Chapter 14 on Gaur or Bison Mr. Somerville gives the amazing opinion that this animal is not a "sporting" one as it seldom attacks. On this line of thinking some of the universally accepted great sporting animals, such as the markhor and the Ovis Poli, are not "sporting"! Surely the author is aware that in hunting the manner of the hunting in relation to the quarry determines whether it gives sport or not. Bison hunted on foot in daylight with the determination to bag only a worthwhile head, can call for junglecraft,

stamina, patience and, on rare occasions, a little courage, and this noble animal is certainly one of the most "sporting" of big-game animals.

On pages 112 and 113 the author refers to visiting water-holes for carnivora during a hunt in October. At this time of the year water is available everywhere and how any experienced shikari could think in terms of visiting a water-hole is beyond me. Quite apart from this arises the question of the ethics of shooting even carnivora over water. But the author on page 130 opines that this method is a necessity now-a-days. Why? After all we still do shoot tiger, leopard and bear by legitimate means. The author goes on to describe on page 114 how night after night he and his friends visited cultivated fields for sambhar. All this occurred in Hazaribagh District, Bihar. *The shooting of herbivora between sunset and sundown is against Forest Rules in Bihar.* Further, no sportsman worthy of the name would shoot herbivora after dark. Are we listening to the confessions of a poacher? Apparently Mr. Somerville has no objection to shooting herbivora after dark, for again on page 49 he describes making a *machan* near a maize field, sitting there after dark and actually taking a shot at a sambhar. This occurred again in Hazaribagh District where the Forest Rules prohibit the shooting of deer after sunset.

In the illustration facing page 73 of a buffalo shot we have the caption indicating that the proud hunter shot the beast over a water-hole! It would appear that Mr. Somerville has no objection to the shooting of at least this species of the herbivora over a water-hole. And this in a book on shikar by an author who claims to despise the poaching fraternity!

Some of Mr. Somerville's statements are naive. On page 2 he states that letters have appeared in the Press *confirming* that there have been tigers of 12 ft. and over (some reaching a length of 15 ft.). Does he mean claiming instead of confirming?

The author's treatment of hunting methods for tiger are poor. He deals merely with sitting up on a *machan* on the grounds that other methods are beyond the average sportsman's purse. The sitting up method probably calls for the minimum of junglecraft needed to hunt tiger but even here there is quite a lot to be said but Mr. Somerville fails to say it. For example, what should one do if one comes across a tiger kill close to where the tiger is obviously lying up (the sitting up procedure here would be different from that of a kill where the tiger is expected to have gone off to lie up)? Or what should be done if a natural kill is in an impossible place to sit up over and the tiger involved known to be suspicious of kills moved? Even in the comparatively simple tiger shikar by sitting up there is a lot to consider, but Mr. Somerville's treatment gives very little advice. His rejection of other forms of tiger shikar are absurd. In the States of Bihar and Orissa, where much of Mr.

Somerville's shikar has taken place, beaters for a tiger beat still cost under a rupee each. A well run tiger beat can be pulled off on many occasions with a score or two of beaters—I know of more than one where six men and less have sufficed. Such tiger hunting calls for skill and is by no means expensive. It is strange that Mr. Somerville has nothing to say about beating for tiger. I am well aware that tiger stalking is not a popular sport. But if the maximum of sport for the least expense is involved, or rather the maximum of sport regardless of expense is to be considered, stalking for tiger offers the cream of tiger hunting. Again Mr. Somerville has nothing to say on the subject.

There are many inaccuracies in his statements which show lack of knowledge. When dealing with elephants he states that even the heart shot will fail to kill this animal. This is absurd. The heart shot for elephant has been used over and over again by elephant hunters both in India and Africa, and is still used at times and will continue to be used, though as Sanderson says the poetry of the sport is apparent in the brain shot. Mr. Somerville is unable to even describe the salient feature of an elephant's walk which he describes merely as a sedate walk. Of course, the distinguishing feature is that there is no diagonal movement of the legs and that near-fore and near-hind and off-fore and off-hind move respectively together.

The author's reference to the Son Cheeta in Hazaribagh District and the statement that it may be a new sub-species of leopard is absurd. The leopard or panther has a golden hide with black spots and Son Cheeta merely means the Golden Spotted One. I hunt extensively in the Hazaribagh and Ranchi areas (I live in Hazaribagh) and all my shikaris, and myself, use at times the term Son Cheeta when referring to leopards or panthers. To expect the discovery of a new sub-species in the Chota Nagpur area is the height of naivette. Mr. Somerville refers to the ban on the shooting of males of horned game. This is done at times in countries such as the U.S.A. where there is on occasion overstocking and the deer population can best be thinned by shooting the females. The reasons given by him on page 96 for the shooting of females are incorrect. So far as India is concerned there is no question of overstocking of horned game and the suggestion that a healthier strain of animals can be had by weeding out females makes no sense, though this is stated by the author.

On page 133 the author states that buffalo and bison graze in the same marshlands. This can happen in particular cases but is not general for the simple reason that the bison is essentially an animal of the hills and the buffalo an animal of the lowlands. The suggestion that these two very different animals deliberately associate indicates that Mr. Somerville is not a keen observer of wildlife. There are other peculiar references made by Mr. Somerville

which have no scientific basis. In his Introduction he refers to Forest Tribes claiming that their lands have become less fertile with the disappearance of wild pig and deer from the area. As this statement is made in the author's plea for wild life conservation the impression one gets is that he too accepts this belief, which is ridiculous.

The author refers to weapons which are suitable for big-game hunting in India. But he has so little to say that it would have been better not to have made any reference at all. His suggestion that a 12 bore taking a 3" cartridge loaded with ball is ideal for tiger should be taken with reservations. I have myself hit a tiger on the tip of the nose with a .470 and the bullet raked down through its palate into the chest cavity and beyond, yet that tiger got away for the time being and lived 24 hours before being recovered. While a shotgun will do for sitting up on a *machan* over a kill it would hardly be the weapon for following up a wounded tiger on foot. In a tiger beat, where beaters have to be considered, and the tiger knocked down as distinct from being merely killed, a shotgun is quite unsuitable. Incidentally, Mr. Somerville's reference to a .12 bore should actually be to a 12 bore.

The book suffers from the defect that there is very little interesting or informative matter on shikar or the habits of wild life, while there is quite a bit of stuff on mystery and the occult.

The book is a very poor effort as a whole.

A. Imam,
Hazaribagh.

[Opinion expressed in this Review Article, as in all non-editorial matter in 'Cheetal' does not express the Editor's opinion and 'Cheetal', or its Editors, cannot be held responsible for the author's opinions.]

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PREDATORS ON PARADE

'Birds of Prey of the World' by Mary Louise Grossman and John Hamlet. Photographs by Shelly Grossman. Cassel. £.6.6s.

Probably for the first time you find so many predatory overlords staring back at you from the pages of a single book. They are there; all the amirs, the sheiks and the pundits. Only the sultan is lacking to complete the picture. I mean the 'peregrinus—peregrinator' of the naturalist and the 'Sultan—Falcon' of the falconer. This is one of the fastest falcons in the world and is in addition a big killer. Not to have won the honour of any mention

in a work of this kind, will I am sure, make 'THAMURAS' (claimed to have been the first falconer and a prehistoric king of Persia) turn in his grave.

Otherwise the book is a wonderful attempt to treat birds of prey the way they never have been treated before. The principal sources from which it has been taken are a legion. Not only is it intended for the general reader but for the Scholar, naturalist and falconer as well. It bears clearness of arrangement and simplicity of definition and these are bound to meet the requirements of the naturalist and those who are casually interested in birds of prey. The colour photographs and black and white pictures are really superb.

As for the rest, if it is conceded that we can love our feathered neighbours who share this planet with us, then this work is definitely calculated to make us understand birds of prey much better and to draw us closer to them.

S. M. Osman
Dehra Dun.

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The Book of Indian Animals: S.H. Prater, (BNHS and the Prince of Wales Museum).

Before his death in 1960, the author had thoroughly revised the first edition of this standard work on Indian animals, and together with a set of 28 illustrations by Paul Barruel, which replace the original imperfect ones, the Second Edition, produced by the Bombay Natural History Society, and the Prince of Wales Museum, Bombay, is a very useful addition.

Monochrome plates by several distinguished wild life photographers and amateurs add a graphic dimension.

To us at the offices of 'Cheetal', there is additional interest in such a volume, as we are fully aware of the painful gap in literature on the subject. We realise that Prater's excellent book, even as revised, does not fully meet the needs of the subject, and we hope that it will be possible to produce a really complete and up-to-date, volume filling up the gaps in factual scientific information, and contemporary data, but knowing the limitations, the Bombay Natural History Society is to be congratulated for giving animal lovers and professionals in the field the chance of acquiring this invaluable reference work once again.

The book is a must for all even vaguely concerned with animals in any way.

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THE MIXTURE AS NEVER BEFORE !

Tiger Country: By Norah Burke, (Putnal and Co. and Rupa: India; 18 shillings.)

Norah Burke, the daughter of an Irish Forest Officer entertaining in her story of the life of an English Forest Officer. But she shows profound ignorance of the history of India. She is full of praise for the Queen's Proclamation. Her ignorance of Indian civilization and Indian history is profound. She thinks that the British power was established in India for putting Indians on a better level of existence. Sometimes her patronizing attitude becomes intolerable. Her book provides enjoyable and provocative reading to the wild life lover.

Tom Hume-Strickland has been appointed in the Indian Forest Service. His grandfather Captain Thomas Strickland was an army officer who had shot at Sona Bagh a white man-eater whose skin was a family heirloom. Tom's father Frank Strickland was a high grade I.C.S. officer. His uncle Harold was a great 'Shikari' who was killed in tiger-huntidg.

Tom Hume-Strickland is ordered to work under Mr. Wilkinson in the Trans-Sarda Forest on the Napal border. On the second day of his arrival in India he kills a three-fourth grown tiger. And this wins him many admirers.

But Tom Strickland's heart again and again goes back to Sona Bagh, the land of White Tigers.

Runital is the land of joy for the young British officers who gather round a group of girls. Marriages are here arranged too. But Tom Strickland flies away from Runital to Sona Bagh where he has received a permit to shoot. He meets Betchu, a hunter of the forest and is given to understand that right then there was no White Tiger there. He is asked to kill a leopard which has been carrying on depredations. After killing the leopard he finds a tigress shifting a white cub to safety.

Tom Strickland gets his transfer to Sona Bagh where the man-eating White Tiger has been carrying on depredations regularly. Newspapers have got vocal and have been urging for the destruction of the ferocious animal.

The White Tiger of Sona Bagh moved from place to place over a large area. Strickland asked his shikari Betchu to be on the trail of the animal. One day the news came that Betchu was killed. Killing the man-eater was more urgent than ever. He asked his followers to go home. He waited in the depth of the forest. "Suddenly from further off, came a satisfied 'Hmmmmmm' as the terrible beast went off to get a drink". Tom came into close contact with the White man-eater. His rifle was ready. When the animal crouched, watching, Tom fired

at point-blank range but did not stop the charge. He met the collision with his rifle braced across him. It went into the tiger's mouth with a clash and the animal bit it in his death throes, leaving deep marks in stock and barrel, the blood spurting from his heart on to the man. Roars, hot breath, blood, saliva—the enormous weight of the beautiful and evil white body—covered Tom, crushed into the dust, while poisonous claws of the most expert killer in the world tore at his legs and shoulders.”

The White man-eater was dead. Ecstasies gushed through him. He let off several triumphant shots to tell those in camp what had happened. Slowly he collapsed across the carcase and his blood flowed over the tiger he had killed.

Not many days later he came to Delhi to claim during the Durbar dance his sweetheart Dolly who was to be married to another.

It would have been better had the book ended here.

The book is filled up with a variety of delightful stuff showing much first hand knowledge of wild life and second hand misinformation about India and Indians.

—Contributed.

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THE PEACOCK

The Peacock—official organ of Indian Ornithological Garden—is a most welcome addition to ornithological literature in the country and the Editor is to be congratulated on bringing out an impressive and valuable publication. The Peacock is interesting and the information provided is valuable. The Peacock will certainly aid the effort for preservation of bird life in the country which is sadly neglected so far.

R.N.M.

LIBRARY

The following books were received for the Society Library. The Society thanks the donors.

No.	Name of Book	Donor
41.	Call of the Tiger.	Publisher
42.	Tiger Country.	.....
43.	Passing of Forests Gods.	.....
44.	Map India and adjacent countries wall mounted.	.....
45.	Forest Gods.	Publisher
46.	Forest Gods.	Publisher
47.	Birds of Prey of the World.	Publisher
48.	The Book of Indian Animals.	Publisher
49.	Hunter at Heart.	.....
50.	A Guide to watching Wild Life.	.....
	How to Catch Them Series	.....
51.	Mackerel	.....
52.	Reservoir and Gravelpit	.....
53.	Rain Bow Trout	.....
54.	Trout	.....
55.	SALMON	.....
56.	Brook Trout	.....
	How to Make Them.	.....
57.	Spoons, Spinners and Plugs	.....
58.	River Fly-Fishing	.....
59.	Ochrona Przyrody.	Publisher
60.	Ahead Lies the Jungle	Mr. V.S. Sirohi, Mainpuri.
61.	The Conservation of Wild Life and Natural Habits in Central and East Africa	.....
62.	Thirty Eight numbers of Journal of the Society for preservation of the Fauna of the Empire.	Presented by T.H. Basset, Canada

Members are requested to donate more books and send cash donations earmarked for the library to the Honorary Secretary.

मौत के मुंह में !

जिस प्रकार नेपाल की तराई का क्षेत्र है उसी प्रकार उत्तरी बंगाल और हिमालय की चरण-चुम्बी बन आच्छादित पहाड़ियों के बीच का क्षेत्र है जिसे “दुअर” के नाम से सम्बोधित किया जाता है। इस क्षेत्र में घने वन हैं जिनमें छोटी-छोटी नदियाँ और नाले बहते हैं। यह क्षेत्र चाय की उपज के लिए उपयुक्त है और यहां घने चाय के बागीचे हैं।

बंगाल और भूटान की सीमा पर ‘कार्तिक’ नामक चाय का बागीचा है जो रैदक जंगल से कुछ मील दूर है। श्री पुलन इसी चाय के बागीचे के मैनेजर थे और स्थानीय शिकार संघ के उपसभापति और एक प्रसिद्ध शिकारी थे। शिकार के उपयुक्त साधन भी उनके पास थे। पास ही के “तुरतुरी” चाय बाग में किसी शिकारी ने एक शेरनी को गोली मार कर घायल कर दिया था। पर यह जानकर कि घायल शेर ही असली शेर होता है शिकारी साहब अपनी जान बचाकर भाग गए, और स्थानीय चाय बागीचे के कुलियों के जीवन में एक नया संकट छोड़ गये। जब कभी ऐसा होता है तो काम बन्द हो जाता है। श्री पुलन को ही उपयुक्त समझ कर उस शेरनी को मारने का काम सौंपा गया, और उन्होंने एक सच्चे शिकारी के नाते यह उत्तरदायित्व स्वीकार किया।

श्री पुलन को समाचार मिला कि जल्मी शेरनी ने एक कुली को काटकर जल्मी कर दिया था वह चिकित्सालय में जाकर मर गया। वन विभाग के दो हाथी “रूपकली” और “पवनप्यारी” के साथ श्री पुलन शेरनी की खोज में गए—‘रूपकली’ पर वह स्वयं सवार थे और ‘पवनप्यारी’ पर उनका ड्राइवर जो शस्त्रहीन था। उचित स्थान पर पहुंचने पर शेरनी की छिपने की भाड़ी उन्हें दिखाई गयी। पर शेरनी वहां नहीं थी। हाथी चला-फिरा कर जंगल में खोज की गयी और आध घंटे खोज के पश्चात शेरनी ने स्वयं ही एक हुँकार ली और बताया कि वह कहाँ है। वह घनी झाड़ियों के एक वन-खण्ड में थी। दोनों हाथी घबड़ा कर भागे और शेरनी ने रूपकली पर जिस पर श्री पुलन सवार थे सीधा हमला बोल दिया। जो कुछ हुआ उसे ठीक बताना मुश्किल है, पर हाथी, पैर किसी गड्ढे में जाने के कारण अथवा किसी अन्य कारण शायद शेरनी के हमले से बचने के लिए मुड़ने से गिर पड़ा। श्री पुलन भी हाथी से गिरे तो ठीक शेरनी के ऊपर। एक तरफ उनका नौकर था और दूसरी तरफ महावत। उनके गिरते ही शेरनी ने श्री पुलन की रायफल को मुंह से पकड़ा—रायफल पर उसके दाँतों के निशान थे—शेरनी के दाँतों में रायफल की लिबलिबी फंसी और दोनों गोलियाँ चल गयी। पहले तो श्री पुलन ने समझा कि उन्होंने ही रायफल चलाई है। शेरनी ने श्री पुलन के बाँये पैर को बुरी तरह से चबा डाला था और दाहिने पैर में भी उसके बड़े-बड़े दाँतों से बने घाव थे। हथनी उठकर भागी तो उसका पैर भी श्री पुलन की दाहिनी बांह पर पड़ा और दो जगह से हड्डी टूट गयी। इसी बीच में महावत एक पेड़ पर चढ़ गया था और नौकर भाग गया था।

श्री पुलन को होश था और महावत जो पेड़ पर था शेरनी और श्री पुलन दोनों को देख रहा था—महावत ने श्री पुलन को संकेत किया कि वह शेरनी से बचने के लिए किधर खिसके। उन्होंने शेरनी से दूर खिसकना शुरू किया। शेरनी पास ही खड़ी देखती रही और गरजती रही; पर हमला नहीं किया—शायद रायफल चलने पर शेरनी के मुंह में बड़ा धक्का लगा होगा क्योंकि उसके दाँत का एक टुकड़ा भी रायफल के कुन्दे में मिला था। वह खिसक कर शेरनी से दूर पहुँचे। पवन प्यारी हथनी पास लायी गई और श्री पुलन को उसकी गद्दी पर बैठाकर शीघ्र ही जलपाई गुड़ी के चिकित्सालय में पहुँचाया गया—फिर इंग्लैण्ड से लकड़ी की टांग लगवा कर फिर अपने काम पर आ गये। महावत को O.B.E. का पदक दिया गया।

अगले दिन तीन और अंग्रेजों ने हाथी पर चढ़कर शेरनी की खोज की और भाड़ियों को घेर लिया—शेरनी फिर गरज कर झपटी पर इस बार शिकारियों ने उसे मार गिराया। मरी शेरनी दुर्बल और हीन दशा में थी। और उसके एक पंजे में बारह बोर बन्दूक के ग्राफ का घाव था जिसमें कीड़े पड़ चुके थे। शेरनी का मारना उसे पीड़ा से मुक्त करना हो गया।

निष्कर्ष

१. शेर जख्मी होने पर ही असली शेर होता है उसके पहले शरीफ वन्य जीव।
२. शेर पर गोली तभी चलाइये जब उसे मार गिराने का काफी भरोसा हो।
३. जख्मी शेर को खुद ही खोजकर मारिए अन्यथा जंगल में कार्य करने वालों को खतरा है। जख्मी शेर अक्सर मनुष्य भक्षी हो जाता है।
४. शेर के शिकार में हाथी पर सावधानी से बैठिये और डरपोक हाथी और महावत पर विश्वास न कीजिए।

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July 9, 1965.

The President & Members,
Executive Committee,
Wild Life Preservation Society of India,
Dehra Dun.

Gentlemen,

We have audited the accounts of the Society for the Year ending 31st March 1965 and as mentioned in our certificate at the foot of the Balance Sheet as at 31st. March 1965, we have the following report for your information :—

2. The Working of the Year shows a deficit of Rs. 1,751/- as compared with Rs. 695/- of the previous year. The increase in deficit is due to increase in expenses of Postage, Stationery, Entertainment and other Miscellaneous.

3. FINANCES : The Bank Balances on 31.3.1965 are Rs. 15,944/- as compared with Rs. 6,239/- on 31.3.1964. The increase of Rs. about 9,700/- is due to Rs. 2,000/- received from Dorabjee Tata Trust for Wild Life Research Project and Rs. 5,439/- received from H.H. Nabha (on account of six Patron Members and Rs. 2,439/- Advance deposit for Patron Members to be introduced by H.H. Nabha).

4. The Loss on 'CHEETAL' is Rs. 1,548/- . Postage expenses on "CHEETAL" are not separately allocated in Postage Book. This should be done in future so that the same be charged to 'CHEETAL' instead of Postage Expenses General.

5. ACCOUNTS : The parttime Accountant did not reconcile the Books and even did not ink the Balances in the Cash Book. With the help of Hony. Treasurer the Accounts are Balanced but it is not possible to carry on with the Accounts unless a proper person knowing accounts is engaged. Bills of Printing are not marked relating to Cheetal, Office & Pads or other expenses. This takes lot of time at the final audit. Similarly Sundry Receipts are not classified in the end of each month. We hope in future these small deficiencies will be removed.

We remain,

Yours faithfully,

For M/s P.N. Bahri & Co.,
Chartered Accountants
Sd. P.N. Bahri, Partner.
Chartered Accountant.

WILD LIFE PRESERVATION

Balance Sheet as at

Prev. year	LIABILITIES	Rs.	P.	Rs.	P.
	Unpaid Expenses :				
	Press Cutting Bureau	...	13	78	
	English Book Depot for Books	...	151	45	
	Goyal Studio for Photo of Annual Meeting	...	308	24	
	Due to Assam Regional Branch	...	124	42	
	Due to Bihar Regional Branch	...	31	00	
1,204	Audit Fee	...	100	00	728 89
	Advance Subscriptions :				
	Ordinary Members	...	55	75	
	Educational	...	50	00	
	Student	...	4	00	
	Life Member	...	9	00	
	Professional	...	34	00	
200	Affiliated and Institutional	...	60	00	212 75
187	Advance Subscription for CHEETAL :	...			408 20
	Donation from H.H. Nabha for I.U.C.N. and R.R. :				
250	(As per Last Balance Sheet)	...			250 00
—	H.H. Nabha for Patron Members: Advance Deposit:	...			2,438 94
1,071	Corbett Prize Fund :	...			
	(As per Last Balance Sheet)				1,071 22
—	Himalayan Wild Life Research Project:				
	(Sir Dorab Jee Tata Trust):	...			2,000 00
	Society Fund:				
	As per last Balance Sheet:		8,019	65	
	Add: Donations: H.H. Nabha for:				
	Godrej Shelves:	...	627	88	
	Books:	...	313	70	
	Ties & Buttons:	...	1,515	91	
	Nature Games:	...	642	60	
		...	3,100	09	
	Others:	...	617	07	
	Patron Members through H.H. Nabha:	...	3,717	16	
	Life Membership:	...	3,000	00	
	Admission Fee:	...	1,133	00	
		...	550	00	
			16,419	81	
8,020	Less: Deficit as per Income and Expenditure Account (annexed)	...	1,750	96	14,668 85
10,932	TOTAL	...			21,778 85

15, Rajpur Road, Dehra Dun.

Dated July 9, 1965.

SOCIETY OF INDIA, DEHRA DUN.

31st. March, 1965

Prev. year	ASSETS	Rs.	P.	Rs.	P.
	Office Furniture and Equipments (At Cost):				
	As per last Balance Sheet:	....	360	00	
	Add: Additions: (Godrej Shelves):	....	627	88	
			987	88	
360	Less: Depreciation for the year:	....	98	88	889 00
	Library Books:				
	Amount Paid:	....	13	55	
	Bills Payable:	....	151	45	
—	Donations from H.H. Nabha:	....	313	70	478 70
	Outstandings:				
	Due for Advertisement (Bill)	....	225	00	
	Due for CHEETAL Subscription:	....	278	75	
	Greeting Cards: (Bills Receivable):	....	60	60	
2,625	Subscription due from Members:	....	1,965	58	2,529 93
	Stock in Hand on 31-3-1965:				
	CHEETAL Copies in Stock:	....	702	00	
	Greeting Cards & Pads:	....	97	50	
	Ties & Buttons:	....	705	87	
1,265	Nature Games:	....	371	70	1,877 07
	Security Deposits:				
	Electric:	....	40	00	
60	Water:	....	20	00	60 00
	Snakes & Ladders (At Cost):				
	As per last Balance Sheet:	....	383	00	
383	Less: Balance Written Off:	....	383	00	— —
	Cash & Bank Balances:				
	On Fixed Deposit with Central Bank of India Ltd., Dehra Dun (Includes Corbett Prize Fund):	....	9,667	39	
6,239	On Current Account with Central Bank of India Ltd., Dehra Dun:	....	6,276	76	15,944 15
10,932	TOTAL	...			21,778 85

As per our separate report of even date addressed to the Members of Executive Committee.

For M/s P.N. BAHRI & Co., Chartered Accountants,
(Sd.) P.N. BAHRI, Partner, Chartered Accountant.

WILD LIFE PRESERVATION Income and Expenditure Account for

Prev. year	EXPENDITURE	Rs.	P.	Rs.	P.	Rs.	P.
1,144	To Salaries			1,165	00		
463	„ Postage and Telegrams			738	14		
250	„ Printing and Stationery			335	86		
840	„ Rent and Taxes			952	00		
68	„ Electric, Water and Conservancy			200	91		
91	„ Entertainment (Annual Meeting Expenses)			500	14		
35	„ Contribution to Assam Regional						
31	„ Contribution to Bihar Regional			31	00		
31	„ Bank Charges			67	82		
100	„ Audit Fee and Accountancy Charges			150	00		
3,053				4,140	87		
	„ Miscellaneous Expenses:						
	Telegraph Renewal	50	00				
	Repairs to Typewriter	32	00				
	Packing Charges	15	63				
4	Other Expenses	34	05	131	68	4,272	55
3,057							
	„ CHEETAL Publications:						
1,881	(Loss) As per Annexure 'A' attached					1,548	29
	„ Amount Written Off:						
	Depreciation, Furniture			98	88		
	Snakes and Ladders			383	00		
90	Old Tie Written Off			6	25	488	13
	„ Free Issues to Members:						
—	(Nature Games=16)					100	80
5,028	TOTAL					6,409	77

15, Rajpur Road, Dehra Dun.
Dated July 9, 1965.

SOCIETY OF INDIA, DEHRA DUN
the Year ending 31st March, 1965

Prev. year	INCOME		Rs. P.	Rs. P.	Rs. P.
By Subscriptions Receipts:					
	Ordinary Members	...	1,206	28	
	Family Members	...	24	00	
	Institutional and Affiliated	...	600	00	
	Professional Members	...	128	00	
	Educational Members	...	150	00	
	Student Members	...	1,446	00	
			3,554	28	
	Add: Advance received last year adjusted	...	190	75	
			3,745	03	
„ Outstanding on 31-3-1965:					
	Ordinary Members	... 1,377	58		
	Educational Members	... 18	00		
	Professional Members	... 150	00		
	Institutional and Affiliated				
	Rs. 180.00 Rs. 240.00	... 420	00	1,965	58
				5,710	61
Less: Subscriptions received in Advance					
	Ordinary Members	... 55	75		
	Educational Members	... 50	00		
	Student Members	... 4	00		
	Institutional Members	... 60	00		
	Professional Members	... 34	00		
		203	75		
2,903	Add: Outstanding on 1-4-1964	... 1,517	71	1,721	46
				3,989	15
„ Pads, Covers and Greeting Cards:					
1,123	As per Annexure 'B' attached	...		98	30
12	„ Fishing Permit:	...		—	
—	„ Nature Games:				
	As per Annexure 'B' attached	...		90	90
23	„ Miscellaneous: (Packing, etc.)	...		10	97
—	„ Postage Receipts:	...		122	81
6	„ Ties and Buttons:				
	As per Annexure 'B' attached	...		131	72
	„ Interest on Fixed Deposits:				
229	(Received on Renewal)	...		214	96
37	„ Suspense:	...		—	
695	„ Deficit: Carried to Society Fund Account	...		1,750	96
5,028	TOTAL			6,409	77

As per our report on the Balance Sheet annexed.

For M/s P.N. BAHRI & Co., Chartered Accountants,
(Sd.) P.N. BAHRI, Partner, Chartered Accountant.

ANNEXURE 'A'

Opening Balance on 1-4-1964

	Rs.	P.	Rs.	P.
Opening Balance on 1-4-1964			847	50
Printing Charges	...		3,598	75
Subscription Recoverable on 31-3-1964			103	25
Advance Subscription for 1965-66			408	20
Press Cutting Charges			70	59
			5,028	29

Sales and Subscription receipts

Sales and Subscription receipts	...	1,152	25	
Advance Subscriptions received in 1963-64	....	187	00	
Advertisement Receipts	...	165	00	
Subscriptions Outstanding on 31-3-1965	...	278	75	
Advertisement Outstanding on 31-3-1965	...	225	00	
Printing Bills Payable at 31-3-1964	...	770	00	
Stock in Hand	...	702	00	3,480 00

Balance on 31-3-1965	...	1,548	29
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Dated July 9, 1965.

Sd. P.N. BAHRI, Partner, *Chartered Accountant.*

WILD LIFE PRESERVATION SOCIETY OF INDIA, DEHRA DUN

ANNEXURE 'B'

Statement of Accounts for the Year ending 31st, March 1965

		Rs.	P.	Rs.	P.	Rs.	P.
Pads, Covers and Greeting Cards:							
<i>Sales:</i>	Pads and Covers	...		416	00		
	Outstanding Bills on 31-3-1965	...		60	60		
	Greeting Cards	...		967	40		
	Pads Transferred	...		24	00		
				1,468	00		
	Stock as on 31-3-1965	...		97	50		
				1,565	50		
<i>Less:</i>	Opening Stock on 1-4-1964	...	375	50			
	Outstanding 1-4-1964	...	1,004	20			
	Printing Charges	...	87	50	1,467	20	98 30
Nature Games:							
	Sales	...	261	00			
	Free Issues to Executive Members	...	100	80			
	Stock in Hand	...	371	70	733	50	
<i>Less:</i>	Donations from H.H. Nabha	...			642	60	90 90
Ties and Buttons:							
<i>Sales:</i>	Ties	...	768	00			
	Buttons	...	209	18	977	18	
	Old Ties Written Off	...			6	25	
<i>Stock:</i>	Ties	...	560	00			
	Buttons	...	145	87	705	87	
					1,689	30	
<i>Less:</i>	Opening Stock	...	41	67			
	Donations from H.H. Nabha	...	1,515	91	1,557	58	131 72

15, Rajpur Road, Dehra Dun.

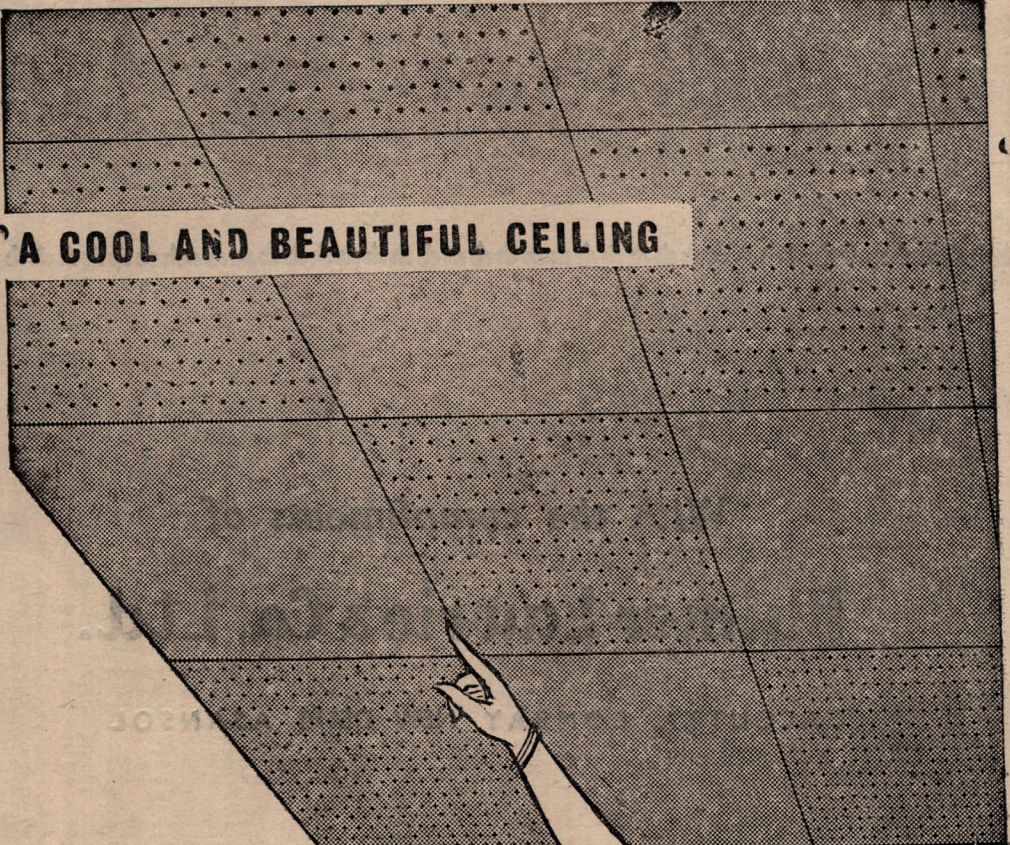
Dated July 9, 1965.

For M/s P.N. BAHRI & Co., *Chartered Accountants,*

Sd. P.N. BAHRI, Partner, *Chartered Accountant.*

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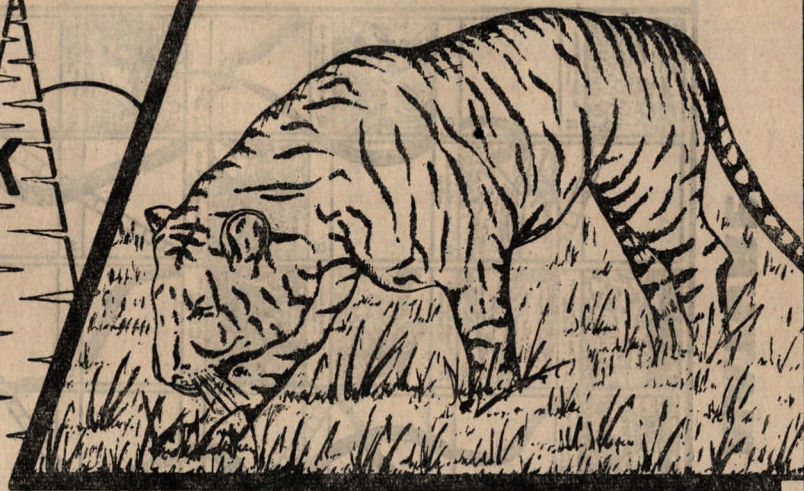
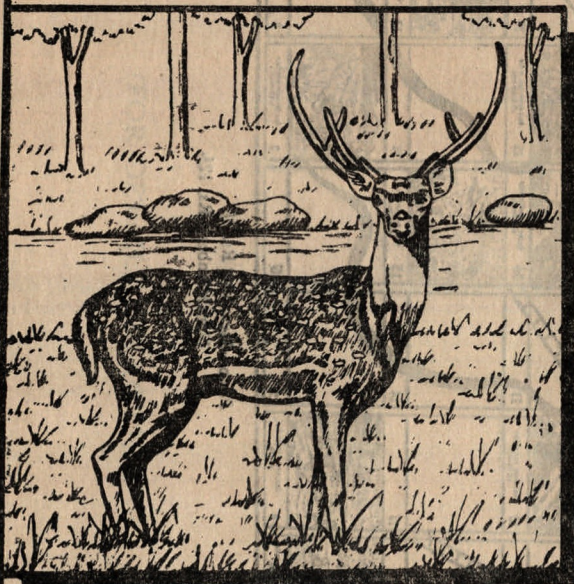
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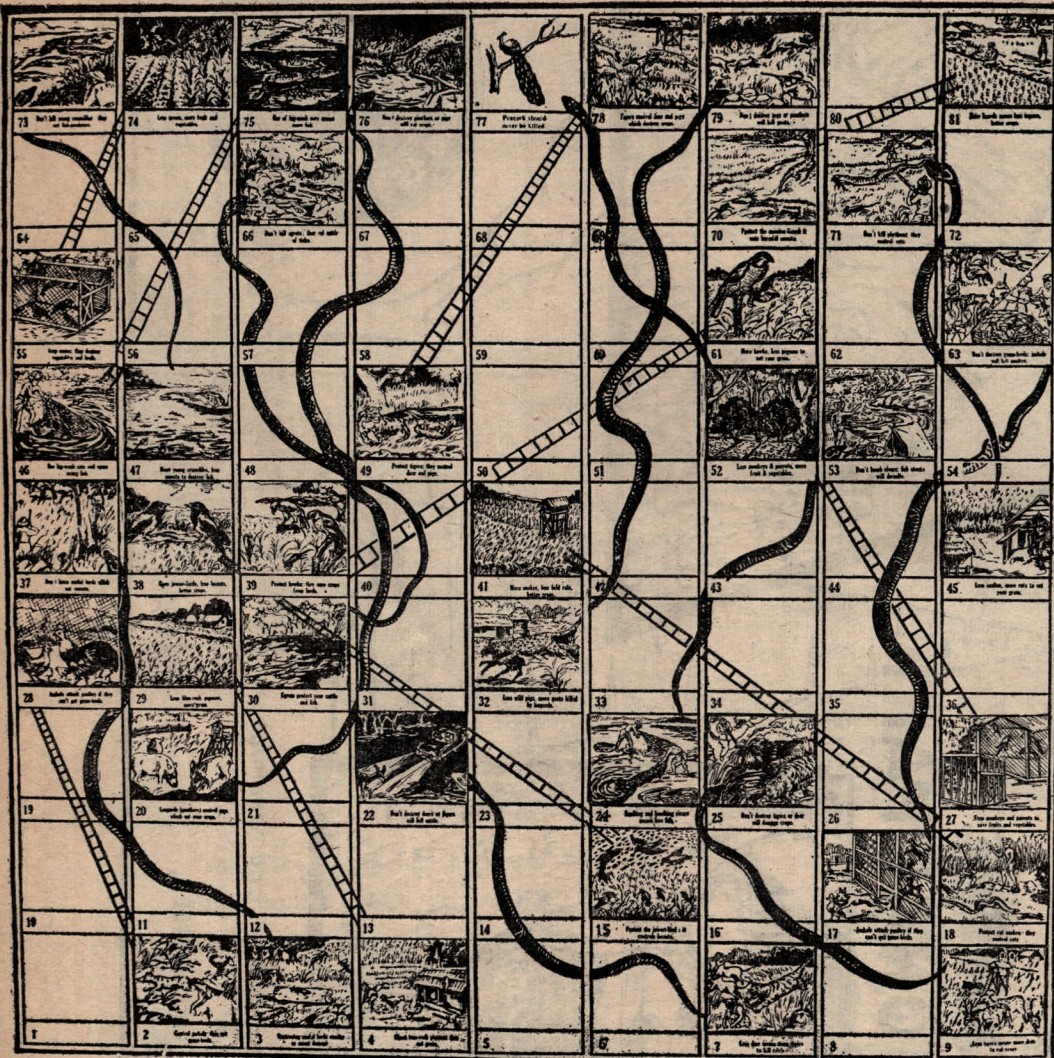
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7 Astley Hall, Dehra Dun.

Wild Life Preservation Society of India, a non-profit, non Government, independent conservation Organisation was started by a group of Wild Life enthusiasts in 1958. Its objects are:-

- (a) To promote interest in the preservation and conservation of all forms of animal life among the youth of the country.
- (b) To assist in enforcing the game and arms rules and to bring to the notice of the authorities any infringements of the same.
- (c) To advise and help Government and the District authorities in the formation, maintenance and protection of Sanctuaries and National Parks.
- (d) To raise funds for the carrying out of the above aims and objects.
- (e) To carry on any other activities which will serve the above objects, including publicity and propaganda and the issue of a journal.
- (f) To assist members of the Society in obtaining shooting and fishing facilities and facilities for viewing and photographing wild life etc.
- (g) To conduct research into the problems of wild life management in India, and in pursuance of this, to initiate, encourage and, where possible, assist in projects for the study of threatened species and related subjects and to provide reference and research facilities for such work.

The society publishes a Half Yearly Journal "CHEETAL".

The game of the Balance of Nature is published by Wild Life Preservation Society of India to inculcate in the growing generation a true knowledge of Wild Life and its value in old and young alike as a love for wild life.

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Address.....
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(FOR DETAILS SEE OVERLEAF)

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VOL. VIII

OCTOBER, 1965

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